Availability and Summary of Documents for Incorporation by Reference

This document proposes to amend FAA Order 7400.11E, Airspace Designations and Reporting Points, dated July 21, 2020, and effective September 15, 2020. FAA Order 7400.11E is publicly available as listed in the **ADDRESSES** section of this document. FAA Order 7400.11E lists Class A, B, C, D, and E airspace areas, air traffic service routes, and reporting points.

The Proposal

The FAA proposes an amendment to Title 14 CFR part 71 to amend Class D airspace, increasing the radius to 4.7 miles from 4.5 miles, removing Class E airspace area designated as an extension to Class D and Class E surface area, as it is no longer necessary, and amend Class E airspace extending upward from 700 feet above the surface at Portsmouth International Airport at Pease, Portsmouth, NH, due to the decommissioning of the PEASE VOR/DME and cancellation of the associated approach procedures (SIAPs). This action would update the airport name to Portsmouth International Airport at Pease, formerly Pease International Tradeport. In addition, the FAA would update the geographic coordinates of the airport and Littlebrook Air Park to coincide with the FAA's database.

Class D and E airspace designations are published in Paragraphs 5000, 6004, and 6005, respectively, of FAA Order 7400.11E, dated July 21, 2020, and effective September 15, 2020, which is incorporated by reference in 14 CFR 71.1. The Class E airspace designations listed in this document will be published subsequently in the Order.

FAA Order 7400.11, Airspace Designations and Reporting Points, is published yearly and effective on September 15.

Regulatory Notices and Analyses

The FAA has determined that this proposed regulation only involves an established body of technical regulations for which frequent and routine amendments are necessary to keep them operationally current. It, therefore: (1) Is not a ''significant regulatory action'' under Executive Order 12866; (2) is not a ''significant rule'' under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and (3) does not warrant preparation of a Regulatory Evaluation as the anticipated impact is so minimal. Since this is a routine matter that will only affect air traffic procedures and air navigation, it is certified that this proposed rule, when promulgated, will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

Environmental Review

This proposal will be subject to an environmental analysis in accordance with FAA Order 1050.1F, ''Environmental Impacts: Policies and Procedures'', prior to any FAA final regulatory action.

Lists of Subjects in 14 CFR Part 71

Airspace, Incorporation by reference, Navigation (air).

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend 14 CFR part 71 as follows:

PART 71—DESIGNATION OF CLASS A, B, C, D, AND E AIRSPACE AREAS; AIR TRAFFIC SERVICE ROUTES; AND REPORTING POINTS

■ 1. The authority citation for part 71 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g); 40103, 40113, 40120; E.O. 10854, 24 FR 9565, 3 CFR, 1959–1963 Comp., p. 389.

§ 71.1 [Amended]

■ 2. The incorporation by reference in 14 CFR 71.1 of Federal Aviation Administration Order 7400.11E, Airspace Designations and Reporting Points, dated July 21, 2020, and effective September 15, 2020, is amended as follows:

Paragraph 5000 Class D Airspace.

* * * * *

ANE NH D Portsmouth, NH [Amended]

Portsmouth International Airport at Pease, NH
(Lat. 43°04′41″ N, long. 70°49′24″ W)
Eliot, Littlebrook Air Park, ME
(Lat. 43°08′35″ N, long. 70°46′24″ W)

That airspace extending upward from the surface to and including 2,600 feet MSL within a 4.7-mile radius of the Portsmouth International Airport at Pease, excluding that airspace within a 1.5-mile radius of the Littlebrook Air Park.

Paragraph 6004 Class E Airspace Designated as an Extension to Class E Surface Area.

* * * * *

ANE NH E4 Portsmouth, NH [Removed]

Paragraph 6005 Class E Airspace Areas Extending Upward from 700 feet or More Above the Surface of the Earth.

* * * * *

ANE NH E5 Portsmouth, NH [Amended]

Portsmouth International Airport at Pease, NH
(Lat. 43°04′41″ N, long. 70°49′24″ W)

That airspace extending upward from 700 feet above the surface within an 8.2-mile radius of Portsmouth International Airport at Pease.

Issued in College Park, Georgia, on July 8, 2021.

Andreese C. Davis,

Manager, Airspace & Procedures Team South, Eastern Service Center, Air Traffic Organization.

[FR Doc. 2021–14932 Filed 7–13–21; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2020–0059; FF09E22000 FXES11130900000 212]

RIN 1018–BE56

Endangered and Threatened Wildlife and Plants; Reclassification of the Palo de Rosa From Endangered to Threatened With Section 4(d) Rule

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to reclassify palo de rosa (*Ottoschulzia rhodoxylon*) from endangered to threatened (downlist) under the Endangered Species Act of 1973, as amended (Act). The proposed downlisting is based on our evaluation of the best available scientific and commercial information, which indicates that the species' status has improved such that it is not currently in danger of extinction throughout all or a significant portion of its range, but that it is still likely to become so in the foreseeable future. We also propose a rule under section 4(d) of the Act that provides for the conservation of palo de rosa.

DATES: We will accept comments received or postmarked on or before September 13, 2021. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by August 30, 2021.

ADDRESSES: You may submit comments on this proposed rule by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *http://www.regulations.gov.* In the Search box, enter FWS–R4–ES–2020–0059, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rule box to locate this document. You may submit a comment by clicking on ''Comment''

(2) *By hard copy:* Submit by U.S. mail: Public Comments Processing, Attn: FWS–R4–ES–2020–0059, U.S. Fish and Wildlife Service, MS: PRB/3W (JAO), 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see Information Requested, below, for more information).

Document availability: This proposed rule, list of literature cited, and supporting documents are available at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2020–0059.

FOR FURTHER INFORMATION CONTACT: Edwin Muñiz, Field Supervisor, U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office, P.O. Box 491, Boquerón, PR 00622; telephone (787) 851–7297. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at (800) 877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species may warrant reclassification from endangered to threatened if it no longer meets the definition of endangered (in danger of extinction). The palo de rosa is listed as endangered, and we are proposing to reclassify (downlist) palo de rosa as threatened, because we have determined it is not currently in danger of extinction. Downlisting a species as a threatened species can only be accomplished by issuing a rulemaking.

What this document does. This rule proposes to reclassify palo de rosa as a threatened species on the Federal List of Endangered and Threatened Plants and to establish provisions under section 4(d) of the Act that are necessary and advisable to provide for the conservation of this species.

The basis for our action. Under the Act, we may determine that a species is an endangered species or a threatened species based on any of the five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. In our August 2017 5-year status review, we recommended downlisting this species from endangered to threatened based on our evaluation of these factors. We may downlist a species if the best available commercial and scientific data indicate the species no longer meets the applicable definition in the Act. We have determined that palo de rosa is no longer in danger of extinction and, therefore, does not meet the definition of an endangered species. However, the species meets the definition of a threatened species under the Act because it is affected by the following current and ongoing threats: Habitat loss, degradation, and fragmentation from urban development; agricultural practices and rights-of-way maintenance, coupled with habitat intrusion by exotics; other natural or manmade factors, such as hurricanes; and this tree's slow growth, limited dispersal, and low recruitment.

The information used for our 2017 5-year review, and the best currently available information, indicate that there are at least 1,144 known individuals (including adults and saplings) of palo de rosa. These individuals are distributed in at least 66 subpopulations (which include the 16 known localities identified at the time of the recovery plan development) throughout Puerto Rico. About 25 (38 percent) of those subpopulations show evidence of reproduction or natural recruitment (USFWS 2017, p. 6, table 1). The increase in the number of known individuals and new localities reflects increased survey efforts but does not necessarily indicate that previously known populations are naturally expanding their range. Approximately 70 percent of individuals occur in areas managed under some conservation status or in areas subject to little habitat modification due to the steep topography in the northern karst region of Puerto Rico. The remaining individuals occur within areas severely encroached and vulnerable to urban or infrastructure development.

The slow growth of this tree and its reproductive biology suggest that palo de rosa is a late successional species, whose saplings may remain under closed canopy until a natural disturbance induces favorable conditions for their development. Although natural disturbances (*e.g.,* tropical storms or hurricanes) can promote the recruitment of saplings into adulthood, the palo de rosa population should be composed of different size classes in order to be able to withstand such stochastic events.

Recovery actions such as propagation and planting have shown to be feasible, and the species is currently being propagated by the Puerto Rico Department of Natural and Environmental Resources (PRDNER), and planted in the Susúa and Guajataca Commonwealth Forests, as well as on lands within Fort Buchanan, owned by the U.S. Army. We have established a memorandum of understanding (MOU) with Fort Buchanan and PRDNER to address the conservation of the species within Fort Buchanan and to promote the propagation of palo de rosa for recovery purposes (U.S. Army, Fort Buchanan 2015, entire).

We are proposing to promulgate a section 4(d) rule. We propose to adopt the Act's section 9(a)(2) prohibitions as a means to provide protective mechanisms to palo de rosa. We also propose specific tailored exceptions to these prohibitions to allow certain activities covered by a permit or by an approved cooperative agreement to carry out conservation programs, which would facilitate the conservation and recovery of the species.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and effective as possible. Therefore, we request comments or information from other concerned governmental agencies, Native American Tribes, the scientific community, industry, or other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) Reasons we should or should not downlist palo de rosa as a threatened species.

(2) New information on the historical and current status, range, distribution, and population size of palo de rosa.

(3) New information on the known and potential threats to palo de rosa, including habitat loss, degradation, and fragmentation; habitat intrusion by exotics; hurricanes; and this tree's slow growth, limited dispersal, and low recruitment.

(4) New information regarding the life history, ecology, and habitat use of palo de rosa.

(5) Current or planned activities within the geographic range of palo de rosa that may have adverse or beneficial impacts on the species.

(6) Information on regulations that are necessary and advisable to provide for the conservation of palo de rosa and that the Service can consider in developing a 4(d) rule for the species.

(7) Information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule or whether any other activities should be excepted from the prohibitions in the 4(d) rule (to the extent permitted by Commonwealth law).

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act (16 U.S.C. 1531 *et seq.*) directs that determinations as to whether any species is an endangered or threatened species must be made ''solely on the basis of the best scientific and commercial data available.''

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *http://www.regulations.gov,* your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *http://www.regulations.gov.* Comments and materials we receive, as well as supporting documentation used in preparing this proposed rule, will be available for public inspection at Docket No. FWS–R4–ES–2020–0059 on *http://www.regulations.gov.*

Because we will consider all comments and information we receive during the comment period, our final determination may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that the species should remain listed as endangered instead of being reclassified as threatened, or we may conclude that the species no longer warrants listing as either an endangered species or a threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions if we conclude it is appropriate in light of comments and new information received.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing. For the immediate future, we will provide these public hearings using webinars that will be announced on the Service's website, in addition to the **Federal Register**. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Peer Review

In accordance with our policy, ''Notice of Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities,'' which was published on July 1, 1994 (59 FR 34270), and our August 22, 2016, Director's Memorandum ''Peer Review Process,'' we will seek the expert opinions of at least three appropriate and independent specialists regarding the scientific data and interpretations contained in this proposed rule. We will send copies of this proposed rule to the peer reviewers immediately following publication in the **Federal Register**. We will ensure that the opinions of peer reviewers are objective and unbiased by following the guidelines set forth in the Director's Memo, which updates and clarifies Service policy on peer review (U.S. Fish and Wildlife Service 2016, entire). The purpose of such review is to ensure that our decisions are based on scientifically sound data, assumptions, and analysis. Accordingly, our final decision may differ from this proposal.

Previous Federal Actions

On April 10, 1990, we published a final rule listing palo de rosa as an endangered species in the **Federal Register** (55 FR 13488). The final rule identified the following threats to palo de rosa: Loss of habitat due to past deforestation and urban development; forest management practices that do not take the species into consideration; inadequacy of existing regulatory mechanisms; and the species' vulnerability to natural disturbances such as flash flooding along stream beds. On September 20, 1994, we completed the recovery plan for this species (USFWS 1994, entire). We completed a 5-year status review on August 9, 2017 (USFWS 2017, entire). In that review, we recommended that palo de rosa be downlisted to threatened because new occurrences of the species have been located and a substantial number of individuals have been documented (*i.e.,* 963 adult individuals (not considering seedlings or saplings) in 54 subpopulations). The 5-year review is available at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2020–0059.

For additional details on previous Federal actions, see Recovery, below. See *https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=Q2EK* for the species profile for this tree.

I. Proposed Reclassification Determination

Species Information

A thorough review of the taxonomy, life history, ecology, and overall viability of the palo de rosa was presented in the 5-year review (USFWS 2017, entire). Below, we present a summary of the biological and distributional information discussed in the 5-year review and new information published or obtained since.

Taxonomy and Species Description

Palo de rosa is a small evergreen tree that may reach up to 15 meters (m) (49 feet (ft)) in height and is a member of the Icacinaceae family (USFWS 1994, p. 1). The branches are smooth and dark gray and have conspicuous small lenticels (raised pores on the stem of a woody plant that allows gas exchange with the atmosphere and internal tissues) (Liogier 1994, p. 41). Leaves are ovate, are rounded or in some cases elliptic, and occasionally have an acute apex and short (6–8 millimeters (mm) (0.2–0.3 inches (in)) petiolate; flowers are solitary or grouped in a three to five flower cluster. The fruit is about 2.5 centimeters (cm) (0.98 in) long and up to 2.2 cm (0.86 in) wide and is smooth and with a thin outer layer that turns dark purple when ripe. The seed is about 2 cm (0.8 in) long (Liogier 1994, p. 41; Santiago Valentín and Viruet-Oquendo 2013, p. 62). Palo de rosa may be difficult to identify when sterile.

Reproductive Biology

When the palo de rosa recovery plan was written, information about the flowering and fruiting pattern was limited due to the species not being well-studied and the infrequent observation of reproductive events, although flowering was observed in May and July 1993 (USFWS 1994, p. 5). A morphological description of the palo de rosa flower and fruit was completed based on material collected from wild individuals, cultivated material, and data from herbarium specimens (Santiago-Valentín and Viruet-Oquendo 2013, entire). The species bears hermaphrodite flowers, flowers for a short period at the beginning of the rainy season and develops fruits subsequently until November (Breckon and Kolterman 1993, p. 15; Santiago-Valentín and Viruet-Oquendo 2013, p. 62). Few buds and flowers occurred from April to May, with an explosive flowering in June, coinciding with the beginning of the rainy season in May. Herbarium specimens demonstrated flowering and fruiting between May and July, with an exception of one specimen with flowers collected in December (Santiago-Valentin and Viruet-Oquendo 2013, p. 62). Flower and fruit production are documented in individuals with diameters at breast high greater than 5 in (12.7 cm). Despite the high number of adult individuals reported, only a few reach that stem size (Breckon and Kolterman 1993, p. 15; USFWS 2009, unpubl. data).

The cluster distribution of seedlings under the parent trees indicates that seeds are dispersed by gravity. Subpopulations in northern Puerto Rico are located on top of limestone hills indicating that some disperser (*e.g.,* animal vector) took them there in the past (USFWS 2017, p. 12). Fruit-eating bats are a possible seed disperser (Breckon and Kolterman 1993, p. 15). However, camera monitoring of a tree bearing mature fruits at the Guánica Commonwealth Forest (GCF) showed that despite the high availability of mature fruits, bats ignored them (Monsegur-Rivera 2004, pers. obs.). The Puerto Rican flower bat (*Phyllonycteris major*) is an extirpated frugivorous bat (Rodríguez-Durán and Kunz 2001, p. 358), and could have acted as a natural disperser of palo de rosa (Monsegur-Rivera 2004–present, pers. obs.). Another hypothesis is that bats no longer recognize palo de rosa fruit as a food source due to the small size of the currently known subpopulations when compared to other food sources (Monsegur-Rivera 2004–present, pers. obs.). Dispersal by water has been hypothesized for the subpopulations in the southern coast, as these subpopulations are located at the bottom of small drainages. However, observations in GCF indicate that establishment of seedlings in these drainages is low, because seeds are buried by sediments and small plants are uprooted by high flows during storms (Monsegur-Rivera 2007, pers. obs.).

Due to the infrequency of fruit production, germination experiments have been limited. Attempts to germinate seeds from the Dorado (Mogotes de Higuillar) population (northern Puerto Rico) have proven to be difficult (10 percent success) as the majority of seeds were attacked by insects (Coleoptera) (Ruiz Lebrón 2002, p. 2). The species also has been germinated by PRDNER and the University of Puerto Rico (Caraballo 2009, pers. comm.). In February 2007, a preliminary germination trial of palo de rosa obtained a 50 percent germination success (Monsegur-Rivera, unpubl. data). The germination starts with the development of a long taproot, probably an adaptation to secure the establishment of the seedlings under closed canopy conditions with a thick bed of leaf litter. Despite damage to the apical meristem (tissue in which new stem and root growth occurs) of the seedlings, seedlings were able to regrow and produced a new stem (Monsegur-Rivera, unpubl. data). This finding indicates that propagation of the species is feasible and may be used in palo de rosa recovery efforts. Palo de rosa is not known to reproduce vegetatively, although multiple stems may regrow from a tree that has been cut.

Distribution, Abundance, and Habitat

Palo de rosa was described by Ignatius Urban (1908) from material collected by Leopold Krug near the municipality of Mayagüez in 1876 (Liogier 1994, p. 42). Based on the description of the type locality (area from where the species was originally collected and described), the collection site may correspond to an area known as Cerro Las Mesas. At the time of listing, palo de rosa was known from nine individuals in three areas and considered endemic to Hispaniola and Puerto Rico (55 FR 13488, April 10, 1990, p. 55 FR 13489). Subpopulations and populations were not defined or identified at the time of listing. The species was known from the limestone hills near the municipality of Bayamón in northern Puerto Rico, several sites in the GCF in southwest Puerto Rico, and one individual on the southern slopes of the Maricao Commonwealth Forest (MCF) (55 FR 13488, April 10, 1990, p. 55 FR 13489).

At the time the recovery plan was written in 1994, there was little information on the species' distribution, ecology, and reproductive biology; therefore, in the recovery plan, species experts considered each subpopulation or cluster of individuals as a population. The recovery plan describes additional individuals observed as a result of increased survey efforts in suitable habitat. In the 1994 recovery plan, we estimated 200 palo de rosa individuals in 16 populations (now defined as subpopulations and noted with ''(RP)'' in the table below). An additional population (now considered a subpopulation) was reported in 1996, increasing the total number of trees to 207 adult individuals (Breckon and Kolterman 1996, p. 4).

The current understanding of palo de rosa's biological and ecological requirements has led us to define a population as a geographical area with unique features (substrate or climate) and continuous forested habitat that provides for genetic exchange among subpopulations (*i.e.,* cross-pollination) where the species occurs. We further considered natural barriers (*e.g.,* mountain ranges and river valleys) and extensive gaps of forested habitat to discern the boundaries of these broader populations because connectivity between subpopulations is critical to support a functional population of palo de rosa due to the cross-pollination requirement of the species. Furthermore, the flowering of palo de rosa is sporadic and not synchronized, thus prompting us to further define a population as groups of subpopulations that show connectivity to secure cross-pollination. Based on the above information, we have determined palo de rosa to be distributed across Puerto Rico in 14 populations composed of 66 subpopulations containing 1,144 individuals (not including seedlings). Following this approach, 8 of the 14 current populations (containing 47 subpopulations with approximately 804 individuals) occur in the geographical areas associated with the 16 populations (now defined as subpopulations) included in the Service's 1994 recovery plan. Since 1994, we have identified 6 additional populations (as currently defined) composed of 19 subpopulations (342 individuals) ranging in size from 5 to 124 individuals in areas associated with remnants of forested habitat suitable for the species. Thus, these additional occurrences are key in understanding the current condition of the species.

Currently, the number of palo de rosa individuals has increased from 9 individuals on protected lands at the time of listing to 407 individuals (representing 36 percent of known individuals or 32 percent of subpopulations) currently occurring in areas managed for conservation (*e.g.,* Commonwealth Forest and Federal lands; see table, below). An additional 396 individuals (38 percent of subpopulations) occur in areas subject to little habitat modification due to the steep topography in the northern karst region of Puerto Rico (see table, below). The remaining 30 percent of the subpopulations (containing approximately 341 individuals) occur within areas severely encroached and vulnerable to urban or infrastructure development (see table, below). However, the resiliency of all subpopulations depends on interaction (cross-pollination) with nearby subpopulations. Despite the increase in the number of known subpopulations and individuals, there are no records of recruited individuals reaching reproductive size in the past three decades. We also do not have any records of recent dispersal and range expansion of the species. The following discussion provides the most updated information on these populations, and their respective geographical areas.

TABLE OF CURRENTLY KNOWN NATURAL POPULATIONS, SUBPOPULATIONS, AND NUMBER OF ADULT INDIVIDUALS OF PALO DE ROSA IN PUERTO RICO

Population	Subpopulation name	Municipality	Evidence of reproduction or recruitment	Number of adults	Development threat [2]	Source
Guánica Commonwealth Forest (GCF).	La Cobana (GCF) (RP) [2].	Yauco	No	7	2	Breckon and Kolterman 1993, p. 4.
	Hoya Honda (GCF) (RP) [2].	Guánica	Yes	16	2	Breckon and Kolterman 1993, p. 4; USFWS 2018, unpubl. data; Monsegur 591, MAPR herbarium.[3]
	Cañon Los Murciélagos (GCF) (RP) [2].	Guánica	Yes	5	2	Breckon and Kolterman 1993, p. 4.
	Cañon Las Eugenias (GCF).	Yauco	No	3	2	Monsegur-Rivera 2009, pers. obs.
	Cañon Las Trichilias (GCF).	Guánica	Yes	49	2	Breckon and Kolterman 2003, p. 4; USFWS 2018, unpubl. data; Monsegur 240, 252 and 880, MAPR herbarium [3]; Breckon 7012, MAPR herbarium.[3]
	Yauco Landfill	Yauco	Yes	40	2	Monsegur-Rivera 2015; Monsegur 1591, MAPR herbarium.[3]
Montes de Barinas	Montes de Barinas.	Yauco	No	5	0	Morales 2011, pers. comm.
Guayanilla-Peñuelas	Guayanilla-CORCO (RP) [2].	Guayanilla	Yes	53	0	Breckon and Kolterman 1993, p. 4; Monsegur-Rivera 2014, unpubl. data; Breckon 4590 and 5201, MAPR herbarium [3]; Monsegur 1586, MAPR herbarium.[3]
Susúa Commonwealth Forest (SCF).	Quebrada Peces-SCF (RP) [2].	Yauco	No	11	2	Breckon and Kolterman 1993, p. 4.
	Quebrada Grande-SCF (RP) [2].	Yauco	Yes	59	2	Breckon and Kolterman 1993, p. 4.
	Río Loco-SCF (RP) [2].	Yauco	No	25	2	Breckon and Kolterman 1993, p. 4.
Cerro Las Mesas and Sierra Bermeja.	Sierra Bermeja (RP) [2].	Cabo Rojo-Lajas	No	2	2	Envirosurvey, Inc. 2016; Monsegur 1583, MAPR herbarium.[3]
	Guaniquilla-Buye (RP) [2].	Cabo Rojo	No	2	0	Monsegur-Rivera 2009, pers. obs.
Aguadilla-Quebradillas	Aguadilla Road PR–2.	Aguadilla	No	1	0	PRHTA [4] 2007, entire.
	Ramey Solar Observatory.	Aguadilla	No	1	1	Acevedo-Rodríguez 2014; Acevedo-Rodríguez 15931, U.S. herbarium.[5]
	Guajataca Commonwealth Forest.	Isabela	No	2	2	Monsegur-Rivera 2009; Monsegur 1051, MAPR herbarium.[3]
	El Costillar-Río Guajataca (RP) [2].	Isabela	Yes	14	1	Breckon and Kolterman 1993, p. 4; Monsegur 1578, MAPR herbarium.[3]
	Río Guajataca (RP) [2].	Isabela	No	1	1	Breckon and Kolterman 1993, p. 4.
	Cara del Indio-Guajataca.	Isabela	No	5	1	PRHTA [4] 2007, entire; Monsegur 1559, MAPR herbarium.[3]
	El Túnel-Guajataca (RP) [2].	Isabela	Yes	24	1	Breckon and Kolterman 1993, p. 4.
	Quebrada Columbiana.	Quebradillas	No	5	1	PRHTA [4] 2007, entire.
	Guajataca Gorge south.	Quebradillas	No	1	1	PRHTA [4] 2007, entire.
	Merendero-Guajataca.	Quebradillas	No	2	1	PRDNER 2009, entire; Monsegur 1087, MAPR herbarium.[3]

TABLE OF CURRENTLY KNOWN NATURAL POPULATIONS, SUBPOPULATIONS, AND NUMBER OF ADULT INDIVIDUALS OF PALO DE ROSA IN PUERTO RICO—Continued

Population	Subpopulation name	Municipality	Evidence of reproduction or recruitment	Number of adults	Development threat [2]	Source
	Quebrada Bellaca.	Quebradillas	No	3	1	Trejo 2441, UPR herbarium.[6]
	Arca de Noe	Quebradillas	No	4	0	PRHTA [4] 2007, entire.
	Piedra Gorda	Camuy	No	1	1	Trejo 2533, UPR herbarium.[6]
	Quebradillas 481	Quebradillas	No	8	0	PRDNER 2015, entire.
Camuy-Hatillo	Río Camuy PR–2 (RP) [2].	Camuy	Yes	10	1	USFWS 2017; Breckon 8126, MAPR herbarium.[3]
	R. Ortiz and Sons Quarry.	Hatillo	No	16	1	Sustache-Sustache 2010, entire.
	Río Camuy-Camino del Río.	Camuy	No	2	1	Monsegur-Rivera 2015, entire.
	Río Camuy oeste	Camuy	Yes	33	1	PRHTA [4] 2007, entire.
	Río Camuy este	Hatillo	No	7	1	PRHTA [4] 2007, entire.
Arecibo	Mata de Plátano	Arecibo	No	2	2	Trejo 2408, UPR herbarium.[6]
	El Tallonal	Arecibo	No	12	2	Trejo 2462, UPR herbarium.[6]
	Highway PR–10	Arecibo	No	1	2	Axelrod 8134, UPRRP herbarium.[7]
Utuado-Ciales (Río Encantado)	Las Abras	Arecibo-Ciales	Yes	32	1	Trejo 2222 and 2473, UPR herbarium.[6]
	Ciales High School.	Ciales	No	2	1	Sustache 685 and 688, SJ herbarium.[8]
	Senderos de Miraflores.	Arecibo	No	2	1	USFWS 2009, entire.
	Miraflores Ward	Arecibo	No	1	1	Acevedo-Rodríguez 11717, U.S. herbarium.[5]
Arecibo-Vega Baja	Cambalache Commonwealth Forest (RP) [2].	Arecibo	No	15	2	Breckon and Kolterman 1993, p. 4; Breckon 8325, MAPR herbarium.[3]
	Tortuguero Lagoon.	Manati	No	1	2	Breckon 8325, MAPR herbarium.[3]
	Hacienda Esperanza.	Manati	Yes	51	2	Monsegur-Rivera 2009; Monsegur 1038, MAPR herbarium [3]; USFWS 2018, unpubl. data.
	Ciudad Médica del Caribe.	Manatí	Yes	59	1	PRDNER 2013, entire.
	Highway PR–604	Manatí	No	2	0	Breckon 8153, MAPR herbarium.[3]
	Highway PR–22	Vega Baja	No	7	0	USFWS 2018, unpubl. data.
	Highway PR–155	Vega Baja	Yes	31	0	USFWS 2018, unpubl. data; Acevedo-Rodríguez 12293, U.S. herbarium.[5]
	Vega Serena	Vega Baja	No	3	0	Monsegur 1091, MAPR herbarium.[3]
	Productora de Agregados.	Vega Baja	No	15	0	PRDNER 2009, entire.
	Vía Verde	Manatí	No	1	1	PREPA [9] 2010, entire.
Dorado	Hacienda Sabanera.	Dorado	Yes	101	1	USFWS 2018, unpubl. data; Monsegur 1584, MAPR herbarium.[3]
	Higuillar Avenue	Dorado	Yes	23	0	Monsegur-Rivera and Sustache-Sustache 2011, entire.
La Virgencita	La Virgencita south.	Dorado	Yes	41	0	PRDNER 2015; USFWS 2018, unpubl. data; Monsegur 1648, MAPR herbarium.[3]
	La Virgencita north.	Dorado	Yes	42	0	USFWS 2018, unpubl. data.
	Río Lajas	Dorado	No	5	0	Trejo 2276, UPR herbarium.[6]
	Highway PR–142	Dorado	No	2	0	USFWS 2018, unpubl. data.
Mogotes de Nevares	Mogotes de Nevares.	Toa Baja	Yes	30	0	PRDNER 2009, entire.
	Mogotes de Nevares/ Campanilla.	Toa Baja	No	8	0	Morales 2014, entire.
	Mogotes de Nevares/ Holsum.	Toa Baja	No	13	0	USFWS 2018, unpubl. data.
	Primate Center	Toa Baja	Yes	4	1	Santiago-Valentín and Rojas-Vázquez 2001, entire.
	Sabana Seca	Toa Baja	Yes	10	2	USFWS 2017, p. 8.
San Juan-Fajardo	Parque Monagas	Bayamon	Yes	70	2	USFWS 2018, unpubl. data; Monsegur 1582, MAPR herbarium.[3]
	Parque de las Ciencias.	Bayamón	Yes	39	1	PRDNER 2013; Proctor 50105, SJ herbarium.[8]
	Fort Buchanan (RP) [2].	Guaynabo	Yes	25	2	USFWS 2018, unpubl data; Rodríguez-Cruz 2013, pers. comm.; Monsegur 1576, MAPR herbarium.[3]
	Mogotes de Caneja.	Guaynabo	Yes	30	1	Breckon 5208, MAPR herbarium [3]; Proctor 51111, SJ herbarium.[8]

TABLE OF CURRENTLY KNOWN NATURAL POPULATIONS, SUBPOPULATIONS, AND NUMBER OF ADULT INDIVIDUALS OF PALO DE ROSA IN PUERTO RICO—Continued

Population	Subpopulation name	Municipality	Evidence of reproduction or recruitment	Number of adults	Development threat [2]	Source
	Monte Picao	Canóvanas	Yes	46	0	PRDNER 2013, entire.
	El Convento	Fajardo	No	1	2	PRDNER 2009; Liogier 32299, UPR herbarium.[6]
Totals	66 Subpopulations.	.....	26 Yes ..... 40 No	1,144 adults	20 Vulnerable. 25 Low. 21 Protected.	

[1] In the Development Threats column, 0 = Vulnerable to development; 1 = Low vulnerability due to topography; and 2 = Protected.
[2] (RP) indicates subpopulations known at the time the recovery plan was finalized (1994).
[3] ''MAPR herbarium'' is the herbarium of the Department of Biology at the University of Puerto Rico at Mayaguez.
[4] ''PRHTA'' is the Puerto Rico Highway and Transportation Authority.
[5] ''U.S. herbarium'' is the United States National Herbarium.
[6] ''UPR herbarium'' is the Botanical Garden of the University of Puerto Rico.
[7] ''UPRRP herbarium'' is the herbarium of the University of Puerto Rico at Rio Piedras.
[8] ''SJ herbarium'' is the herbarium of the University of Puerto Rico at San Juan.
[9] ''PREPA'' is the Puerto Rico Energy and Power Authority.

The distribution of palo de rosa extends along the southern coast of Puerto Rico, from the municipality of Cabo Rojo east to the municipality of Guayanilla, in five geographical areas or populations: (1) Guánica Commonwealth Forest, (2) Montes de Barinas, (3) Guayanilla-Peñuelas, (4) Susúa Commonwealth Forest, and (5) Cerro Las Mesas-Sierra Bermeja. In addition, palo de rosa extends along the northern coast of Puerto Rico from the municipality of Aguadilla east to the municipality of Fajardo in the following nine areas or populations: (1) Aguadilla-Quebradillas, (2) Camuy-Hatillo, (3) Arecibo, (4) Utuado-Ciales, (5) Arecibo-Vega Baja, (6) Dorado, (7) La Virgencita, (8) Mogotes de Nevares, and (9) San Juan-Fajardo (USFWS 2017, p. 11).

The range of the species extends to Hispaniola (Dominican Republic and Haiti) (Acevedo-Rodríguez and Strong, 2012, p. 369; Axelrod 2011, p. 184); however, there is little information on the population structure and status of palo de rosa in these countries, and information is limited to scattered herbarium collections. In the Dominican Republic, the species occurs in Provincia (Province) de La Altagracia, Provincia de Samaná, Provincia de Puerto Plata, Provincia de Pedernales, and Provincia de San Cristobal (JBSD, unpubl. data). On the northern coast of Haiti, palo de rosa has been recorded at ''Massif du Nord'' along a dry river (JBSD, unpubl. data). However, these herbarium specimens provide no data on the subpopulation or population abundance or number of associated individuals. Palo de rosa is categorized as critically endangered according to the Red List of Vascular Flora in the Dominican Republic (*Lista Roja de la Flora Vascular en República Dominicana*), an assessment of the conservation status of all vascular plants in the Dominican Republic as determined by the Ministry of Higher Education Science and Technology Ministry (Garcia et al. 2016, p. 4).

The following information summarizes the current abundance, distribution, and habitat of palo de rosa populations in Puerto Rico.

Populations Along the Southern Coast of Puerto Rico

Guánica Commonwealth Forest (GCF): The GCF is a natural area comprising one of the best remnants of subtropical dry forest vegetation in Puerto Rico and still harbors remnants of pristine dry limestone forest (primary vegetation) that is prime habitat for palo de rosa (Monsegur-Rivera 2009, p. 3). The GCF has been managed for conservation since 1930, following its designation as a public forest in 1917 (Álvarez *et al.* 1990, p. 3; Murphy and Lugo 1990, p. 15). The climate in this forest is seasonal, with most precipitation occurring between September and October (Lugo *et al.* 1978, p. 278).

All known palo de rosa subpopulations found within the dry limestone forests along the southern coast of Puerto Rico occur at the bottom of forested ravines (areas that provide enough moisture for seedling recruitment). These ravines are mesic (moist) habitats where evidence of natural recruitment has been documented (Monsegur-Rivera 2003–2018, pers. obs.). Eighty palo de rosa individuals have been documented in five subpopulations within the GCF (see table, above) (Breckon and Kolterman 1993, p. 4; Monsegur-Rivera 2009–2018, pers. obs.; USFWS 2018, unpubl. data). Fruit production has been recorded at Cañón Hoya Honda, Cañón Los Murciélagos, and Cañón Las Trichilias (USFWS 2017, pp. 7–8) (see table 1, above). Despite the overall dry habitat conditions at the GCF, natural recruitment of this species has been recorded at Cañón Hoya Honda and Cañón Las Trichilias. The Yauco Landfill subpopulation provides connectivity with the northernmost GCF subpopulation, bringing the GCF population to 120 (see table, above) (USFWS 2017, p. 7).

Montes de Barinas: The range of palo de rosa extends from the GCF north to the Montes de Barinas hills (range of limestone hills along the boundary of the municipalities of Yauco and Guayanilla) in habitat similar to that of the GCF (Monsegur-Rivera 2009–2018, pers. obs.). This is a tract of privately owned lands located primarily along Indios Ward in the municipality of Guayanilla, and Cambalache Ward in the municipality of Yauco. The forest was partially logged for charcoal production and ranching; however, the prime habitat for native and endemic plant species remains undisturbed due to its marginal agricultural value (79 FR 53315, September 9, 2014, p. 79 FR 53326). The number of palo de rosa individuals may be greater than the five currently known, as this habitat has not been adequately surveyed (Morales 2011, pers. comm.).

Guayanilla-Peñuelas: The range of palo de rosa extends east to Cedro Ward in the municipality of Guayanilla, where the species was collected along a forested drainage (MAPR, unpubl. data). This population is composed of at least 53 individuals, with some evidence of natural recruitment (Monsegur-Rivera 2014, unpubl. data), suggesting the population is stable (USFWS 2017, p. 15) (see table, above). Additional subpopulations may occur on undisturbed habitat remnants of evergreen dry forest over limestone substrate in the municipality of Peñuelas (north of the Peñuelas

Landfill) (Monsegur-Rivera 2020, pers. obs.).

Susúa Commonwealth Forest (SCF): The habitat of palo de rosa includes moist drainages and rivers on serpentine soils within the Susúa Commonwealth Forest (SCF). Palo de rosa is known from 95 individuals (including saplings) in three subpopulations in the SCF (see table, above) (Breckon and Kolterman 1993, p. 4; UPR, unpubl. data). No seedlings have been recorded in surveys of the SCF population (Breckon and Kolterman 1993, p. 4; Hamilton 2018, p. 31).

Similar habitat on serpentine soils extends northwest of the SCF to the boundaries of the MCF. In this forest, palo de rosa is historically known from a single individual in the upper watershed of the Río Cupeyes (Cupeyes River), on the edge of former State Road PR–362 (MAPR, unpubl. data). The palo de rosa tree was apparently killed due to lightning damage, although other individuals may occur in this inaccessible area (Monsegur-Rivera 2006, pers. obs.).

Cerro Las Mesas (Mayagüez) and Sierra Bermeja (Lajas and Cabo Rojo): The type specimen collected in 1876 was likely collected between Cerro Las Mesas in the municipality of Mayagüez and the area north of Poblado Rosario in the municipality of San German (Monsegur-Rivera 2018, pers. obs.). Cerro Las Mesas is the westernmost distribution of the serpentine outcrops in Puerto Rico and lies within the subtropical moist forest life zone (Ewel and Witmore 1973, p. 72). Palo de rosa was misidentified in the Sierra Bermeja subpopulation, then discovered in 2015 at La Tinaja on the Laguna Cartegena National Wildlife Refuge (LCNWR) and in 2016 on a property known as Finca María Luisa, currently under a conservation easement managed by Para La Naturaleza, Inc. (PLN), the operational unit of The Conservation Trust of Puerto Rico (see table, above) (Breckon and Kolterman 1996, p. 6; PLN 2013, entire; Envirosurvey, Inc. 2016, p. 9; MAPR, unpubl. data). The Sierra Bermeja subpopulation co-occurs with five other federally listed plants, indicating high-quality habitat with potential for undetected palo de rosa. The two individuals in the Guaniquilla-Buye subpopulation occur in an area with small hills with limestone outcrops that is located about 9.6 kilometers (6 miles) west-northwest of Sierra Bermeja, adjacent to an area known as Punta Guaniquilla in the municipality of Cabo Rojo (see table, above) (Vázquez and Kolterman 1998, p. 277).

Populations Along the Northern Coast of Puerto Rico

Palo de rosa also occurs in the northern limestone belt in the karst region of Puerto Rico. This area along the northern coast is important to the conservation of palo de rosa (USFWS 2017, p.11). Despite deforestation for agriculture in the 1930s, a west-to-east band of continuous forested landscape extends from Aguadilla to San Juan, and additional limestone outcrops extend to the northeast corner of Puerto Rico in the municipalities of Loíza and Fajardo (Lugo *et al.* 2001, pp. 1–2; Miller and Lugo 2009, p. 95). The southern and northern limestone belts differ in climate, with wet and moist life zones (*sensu* Holdridge 1967) characterizing the environmental conditions along the north coast of Puerto Rico (Lugo *et al.* 2001, p. 5). The karst area is characterized by a steep topography and a dense concentration of haystack hills or *mogotes,* with valleys and sinkholes between the hills (Lugo *et al.* 2001, p. 11). The steep topography and low agricultural value provide refugia and serve as a seed source for natural regeneration on adjacent forested lands following the abandonment of agricultural lands.

Aguadilla-Quebradillas (including the Río Guajataca): Fourteen subpopulations make up the Aguadilla-Quebradillas population. The westernmost subpopulation of palo de rosa occurs in the municipality of Aguadilla (USFWS 2017, p. 7). The two subpopulations in this municipality are single trees, with no evidence of recruitment (see table, above) (Monsegur-Rivera 2015, pers. obs.; UPR unpubl. data). Rare endemic plants along the cliff areas from Aguadilla to Quebradillas highlight the good habitat quality; hence, more individuals of palo de rosa may occur in this area and in suitable habitat south and east of the municipality of Aguadilla, along an area known as Cordillera Jaicoa, a rough karst region between the municipalities of Moca and Isabela (Caraballo and Santiago-Valentín 2011, p. 2; Acevedo-Rodríguez 2014, p. 7).

Cordillera Jaicoa extends east to the Guajataca Commonwealth Forest (GuCF), which is in the municipality of Isabela and covers about 2,357 ac (953.8 ha) (PRDNER 2008, p. 1). Palo de rosa is known from one subpopulation at the GuCF with no evidence of recruitment (USFWS 2017, p. 7). Fifty-two individuals in seven subpopulations of palo de rosa occur in or near the Río Guajataca (Guajataca Gorge), with natural recruitment recorded in the two largest subpopulations (see table, above) (Breckon and Kolterman 1996, p. 4; Monsegur-Rivera 2003–2018, pers. obs.; PRHTA 2007, pp. 16–18; USFWS 2017, p. 7).

Four additional scattered subpopulations with 16 palo de rosa individuals occur in the municipality of Quebradillas and Camuy (PRHTA 2007, pp. 16–18; PRDNER 2015, p. 16; UPR, unpubl. data), just east of Lago Guajataca (Guajataca Reservoir). Thus, the current number of individuals for the subpopulations in Aguadilla, the GuCF, the Guajataca Gorge, and neighboring lands is at least 72 individuals distributed along variable size classes, and with evidence of recruitment in at least two subpopulations (see table, above).

Camuy-Hatillo (Río Camuy): Another population of palo de rosa occurs along the margins of the Río Camuy, between the municipalities of Camuy and Hatillo. Five subpopulations have been discovered since 2006 (see table, above) (Sustache-Sustache 2010, p. 7; Monsegur-Rivera 2015, pers. obs.; MAPR, unpubl. data). Two subpopulations have seedlings and evidence of recruitment (see table, above) (PRHTA 2007, p. 19; Morales 2014, unpubl. data; USFWS 2017, p. 8). One subpopulation was recorded during the evaluation for a proposed quarry expansion and noted in association with other endemic trees (*e.g., Manilkara pleeana* (mameyuelo) and *Polygala cowellii* (árbol de violeta)) (Sustache-Sustache 2010, p. 7). As the Guajataca Gorge and the Río Camuy areas remain relatively unexplored, we expect additional individuals of palo de rosa may occur there. The current estimated number of palo de rosa individuals in the Camuy-Hatillo population is 68 adults (see table, above).

Arecibo (including Río Tanamá and Río Abajo Commonwealth Forest): Farther east, three palo de rosa subpopulations occur in the Arecibo municipality. Two of the three subpopulations occur in the 159-ha (392-ac) natural areas of El Tallonal and Mata de Plátano with an approved Private Forest Stewardship Management Plan (PRDNER 2005, entire). Available information indicates that at least 15 individuals occur on El Tallonal, Mata de Plátano, and the Río Abajo Commonwealth Forest (RACF) (see table, above). Additional subpopulations may occur along the margins of the Río Tanamá (Tanamá River) and the steep cliff areas in the RACF. The forested corridor of the Río Tanamá connects Mata de Plátano and El Tallonal to the RACF between the municipalities of Arecibo and Utuado, where palo de rosa also occurs.

Although palo de rosa is known only from one individual in the RACF collected in 1994, suitable habitat occurs within the RACF and the species may be found within the forest boundaries (Acevedo-Rodríguez and Axelrod 1999, p. 277).

Utuado-Ciales (Río Encantado): Palo de rosa subpopulations extend east of Lago Dos Bocas (Dos Bocas Reservoir) from Finca Opiola east to the town of Ciales (Río Encantado), in habitat similar to the RACF. The general area is known as the Río Encantado Natural Protected Area, a mosaic of forested habitat among the municipalities of Florida, Manatí, and Ciales, occupying 736 ha (1,818 ac) managed by PLN (PLN 2011b, p. 5). At least 37 palo de rosa individuals occur in four subpopulations, with one subpopulation (Las Abras) showing some evidence of recruitment. The Río Encantado area remains botanically unexplored due to the remoteness and steepness of the terrain; thus, we anticipate that additional palo de rosa subpopulations may occur in the Río Encantado area. Additional subpopulations of this species extend north to a low (west to east) chain of *mogotes* at Miraflores Ward, in Arecibo.

Arecibo-Vega Baja (including Cambalache Commonwealth Forest (CCF), Laguna Tortuguero Natural Reserve (LTNR), and Hacienda La Esperanza Natural Reserve): The Arecibo-Vega Baja population includes 10 subpopulations, 3 of which show evidence of recruitment (see table, above). Subpopulations occur within the protected areas of the CCF, the LTNR between the municipalities of Manatí and Vega Alta, and at Hacienda La Esperanza Natural Reserve in the municipality of Manatí (see table, above) (Breckon and Kolterman 1993, p. 4; PLN 2011a, p. 3). Hacienda La Esperanza Natural Reserve is managed by PLN, and covers an area of approximately 925 ha (2,286 ac) between the CCF and the LTNR, including a coastal valley with cemented sand dunes and a series of *mogotes* that provide habitat for palo de rosa (PLN 2011a, p. 3). Additional palo de rosa individuals may occur in this subpopulation as the entire area with suitable habitat has not been surveyed. Five additional subpopulations of the species occur on private lands in the municipalities of Manatí and Vega Baja (see table, above). Thus, the current number of individuals for the region between the CCF, Hacienda La Esperanza Natural Reserve, LTNR, and neighboring private lands is at least 185 plants (see table, above). An historical specimen from Islote Ward in Arecibo indicates the species' habitat extended to the sand dunes in the past (UPR, unpubl. data). However, this specimen is from the 1940s, and the area of Islote has been almost entirely deforested for agriculture and urban development, we have determined this subpopulation is extirpated (Monsegur-Rivera 2006, pers. obs.).

Dorado (Mogotes de Higuillar): The area of Mogotes de Higuillar represents high-quality habitat for palo de rosa as evidenced by the two subpopulations with strong recruitment. The Hacienda Sabanera subpopulation (formerly known as Hacienda San Martín) was assessed pre- and post-hurricane and showed no loss of individuals (84 and 101, respectively) and had different size classes represented (see table, above) (USFWS 2017, p. 8; USFWS 2018, p. 12). The higher number of palo de rosa individuals recorded during 2018 does not mean a population increase compared to previous surveys as neither assessment covered the entire area of suitable habitat. The subpopulation discovered in 2011 just south of the Hacienda Sabanera subpopulation shows strong evidence of recruitment as well with adult trees, saplings, and hundreds of seedlings (Monsegur-Rivera and Sustache 2011, p. 3; USFWS 2017, p. 8). Thus, the number of palo de rosa individuals for the area comprising Mogotes de Higuillar and neighboring lands is at least 124, with evidence of natural recruitment that includes seedlings and saplings (see table, above).

La Virgencita: The distribution of palo de rosa extends south of Highway PR–22, to the area known as Cruce La Virgencita where the species was recorded in 2014. Of the four subpopulations, the La Virgencita south subpopulation habitat is highlighted by the presence of multiple endemic species and species with narrow distribution (PRDNER 2015, pp. 13–15). The four subpopulations in La Virgencita and adjacent *mogotes* are made up of at least 90 trees, with evidence of saplings and seedlings in the two La Virgencita subpopulations (see table, above). The presence of other rare species in adjacent *mogotes* is an indicator of potentially suitable palo de rosa habitat with little disturbance and highlights the possible occurrence of additional individuals.

Mogotes de Nevares and Sabana Seca: The range of palo de Rosa extends west of Río La Plata (La Plata River) to an area known as Mogotes de Nevares and north to the former Sabana Seca Naval Station in the municipality of Toa Baja. There are scattered records of the species from the area of Mogotes de Nevares, but early collections do not estimate abundance. The five subpopulations in Mogotes de Nevares include three subpopulations (Mogotes de Navares, Primate Center, and Sabana Seca) with evidence of recruitment (see table, above). A subpopulation occurs on the former Sabana Seca Naval Station and a second on an adjacent area near the Primate Research Center (Santiago-Valentín and Rojas Vázquez 2001, p. 57; Monsegur-Rivera 2006, pers. obs.). The best available information and recent survey data in the area of Mogotes de Nevares account for at least 65 individuals of different size classes, including seedlings (see table, above). Due to the good quality of the habitat and the presence of remnants of native vegetation, it is very likely additional, undetected subpopulations of palo de rosa occur along these *mogotes.*

San Juan Metropolitan Area (including neighboring municipalities of Bayamón and Guaynabo, and east to Fajardo): In the metropolitan area of San Juan, palo de rosa occurs at four subpopulations in the municipalities of Bayamón (2) and Guaynabo (2) (see table, above). Five of the subpopulations in the San Juan-Fajardo population show evidence of recruitment; only the El Convento subpopulation does not. The Parque Monagas subpopulation occurs in a small, forested area managed for recreation and shows evidence of recruitment post-Hurricane María (USFWS 2018, p. 21). The palo de rosa subpopulation in Fort Buchanan is noted in the 1994 recovery plan, and saplings and new seedlings were noted in a post-Hurricane María assessment (USFWS 2018, p. 25). The Fort Buchanan and Mogotes de Caneja subpopulations are part of a larger chain of *mogotes* known as Mogotes de Caneja that were fragmented due to the construction of Highway PR–22. Two subpopulations (Monte Picao and El Convento) occur east of the municipality of San Juan in small limestone outcrops (see table, above). Based on the available information, the palo de rosa subpopulations at Parque de las Ciencias, Parque Monagas, and Fort Buchanan (including the entire area of Mogotes de Caneja), and the scattered subpopulations along northeast Puerto Rico, are estimated at least 211 individuals, including saplings, and with evidence of seedling recruitment (see table, above).

Palo de rosa occurs in variable habitats but is dependent on the specific microhabitat conditions. On dry limestone forest like the GCF, the species occurs at the bottom of drainages that provide moisture, whereas at the SCF, palo de rosa occurs

along the borders of rivers. The subpopulations along the northern karst of Puerto Rico are found on the top of limestone hills, possibly because those areas have no agricultural value, and so were not impacted by conversion to agricultural lands. Such variability in habitats indicates the species' current fragmented distribution and lack of connectivity between populations are the result of earlier land-clearing and habitat modification. Information from specimens deposited at multiple herbaria (*i.e.,* New York Botanical Garden, Smithsonian Institution, UPR, UPRRP, and MAPR) suggests palo de rosa was originally more common and widespread throughout Puerto Rico.

Recruitment and Population Structure

At least 25 subpopulations of the 66 subpopulations show evidence of fruit production and seedling or sapling recruitment (see table, above) (USFWS 2017, pp. 8, 11–12). Fruit production and seed germination have been documented in several subpopulations (Monsegur-Rivera 2016, pers. obs.). However, individual palo de rosa trees grow extremely slowly and the growth of the saplings is also quite slow, with an estimated height of less than 1 m (3.3 ft) after 20 years growth. Therefore, it is estimated that, under natural conditions, individuals of palo de rosa may require at least 40 years to reach a reproductive size, and the currently known subpopulations are experiencing slow recruitment (Monsegur-Rivera 2018, pers. obs.). In addition, seeds of this species are not dispersed by any discernible method other than gravity. Thus, recruitment is limited to the proximity of the parental tree, limiting the species' potential to colonize further suitable habitat, and limiting the survival of clustered seedlings due to closed canopy conditions and competition with the parental tree.

Palo de rosa is a late successional species and requires several decades to reach a reproductive size under natural conditions. Evidence from herbarium specimens suggests that palo de rosa once extended to the coastal lowlands of Puerto Rico, including dune ecosystems. Population dynamics and survey assessments support the hypothesis that palo de rosa is a late successional species, whose saplings may remain dormant under closed canopy conditions, until there is some natural disturbance that provides favorable conditions for the development of the saplings. Thus, the species may require an open canopy to promote seedling growth and is adapted to natural disturbances such as hurricanes (Breckon and Kolterman 1996). Under this scenario, the natural populations show a slow natural recruitment that requires stable habitat conditions with a regime of natural disturbance (*i.e.,* tropical storms or hurricanes).

Reproductive events (*i.e.,* flowering and fruiting) have been associated with bigger trees as observed in four subpopulations, where tree diameters reach 13–20.5 cm (5.1–8.1 in) and canopies are higher (at least 10 m) (32.8 ft) (Breckon and Kolterman 1992, p. 8; USFWS 2009, p. 4). For example, one large tree in the El Costillar-Río Guajataca (subpopulation had an estimated 1,000 seedlings under one tree with an almost 90 percent survivorship of 156 monitored seedlings after 18 months (Breckon and Kolterman 1992, p. 8). Further visits to this subpopulation indicate the survival of seedlings and saplings remains high, with evidence of additional recruitment (Monsegur-Rivera 2007, 2012, and 2014, pers. obs.).

Recruitment may be intermittent in some subpopulations. For example, a subpopulation with no seedling survival following a fruiting event in 2004 was noted to contain about 30 small saplings in the post-Hurricane María assessment in 2018, suggesting the subpopulation is slowly recruiting (USFWS 2018, p. 25). Since 2009, hundreds of seedlings have been recorded in the Fort Buchanan subpopulation (Monsegur-Rivera 2009–present, pers. obs.). In 2018, at least 12 saplings ranging from 0.3–1.0 m (0.9–3.3 ft) were observed. Saplings this size can withstand seasonal drought stress, and individuals are likely to persist in the long term if the habitat remains unaltered. Cross-pollination between subpopulation maximizes the likelihood of fruit production and contributes to recruitment, which underscores the importance of conserving the species through a landscape approach.

Of the 26 subpopulations currently showing evidence of natural recruitment, 9 of the 26 occur in areas that are managed for conservation. The 9 subpopulations constitute 36 percent of subpopulations showing natural recruitment and contain nearly 300 individuals in total. There is no evidence of natural recruitment at this time for the remaining 40 subpopulations, although the species' life history implies that recruitment may still occur in these populations when a canopy opening is created and suitable conditions for recruitment are present. Forest cover in Puerto Rico has increased since the widespread deforestation in the 1930s–1950s (Marcano-Vega *et al.* 2015, p. 67), but the availability of suitable habitat prior to deforestation and habitat fragmentation implies palo de rosa may have had greater abundance and wider distribution. Although current information on population structure indicates the species requires some open canopy areas to promote recruitment, widespread deforestation fragments habitat and creates edges (habitat transition zones). The possible long-term negative effects of habitat fragmentation and edge effect on subpopulations with recruitment adjacent to habitat disturbance are still unknown. Current observations from the 2018 post-hurricane assessment suggest subpopulations encroached by development or agriculture were negatively affected by weedy vegetation invading the habitat following Hurricane María (*e.g., Cayaponia americana* (bejuco de torero), *Dioscorea alata* (ñame), and *Thunbergia grandiflora* (pompeya). However, the extent of such impact remains uncertain and further monitoring is needed. Such information highlights the effect of habitat fragmentation on the natural recruitment of palo de rosa.

Recovery Criteria

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Recovery plans must, to the maximum extent practicable, include objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of section 4 of the Act, that the species be removed from the list.

Recovery plans provide a roadmap for us and our partners on methods of enhancing conservation and minimizing threats to listed species, as well as measurable criteria against which to evaluate progress towards recovery and assess the species' likely future condition. However, they are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. A decision to revise the status of a species, or to delist a species is ultimately based on an analysis of the best scientific and commercial data available to determine whether a species is no longer an endangered species or a threatened species, regardless of whether that information differs from the recovery plan.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may be exceeded

while other criteria may not yet be accomplished. In that instance, we may determine that the threats are minimized sufficiently and that the species is robust enough that it no longer meets the definition of an endangered or threatened species. In other cases, we may discover new recovery opportunities after having finalized the recovery. Parties seeking to conserve the species may use these opportunities instead of methods identified in the recovery plan. Likewise, we may learn new information about the species after we finalize the recovery plan. The new information may change the extent to which existing criteria are appropriate for identifying recovery of the species. The recovery of a species is a dynamic process requiring adaptive management that may, or may not, fully follow all of the guidance provided in a recovery plan.

The following discussion provides an analysis of the recovery criteria and goals as they relate to evaluating the status of the taxon. The recovery plan for this species does not provide downlisting criteria (USFWS 1994, entire). The recovery plan for palo de rosa indicates the species could be considered for delisting when the following criteria are met: (1) Populations known to occur on privately owned land are placed under protective status; (2) an agreement between the Service and the U.S. Army concerning the protection of the species on their land (Fort Buchanan) has been prepared and implemented; and (3) mechanisms for the protection of palo de rosa have been incorporated into management plans for Maricao, Guánica, Susúa, and Cambalache Commonwealth Forests. Also, the plan notes that given the discovery of additional populations, priority should be given to enhancement and protection of existing populations in protected areas and the protection of palo de rosa on privately owned land (USFWS 1994, p. 13). At the time the recovery plan was written, only 200 individuals in 16 populations (currently defined as subpopulations) were known. In addition, the lack of recruitment in palo de rosa populations was not known to be a concern; therefore, recovery criteria primarily address protection of palo de rosa habitat. We apply our current understanding of the species' range, biology, and threats to these delisting criteria to support our rationale for why downlisting is appropriate.

Delisting criterion 1 has been partially met. At the time the recovery plan was written, 4 of 16 populations (now defined as subpopulations) occurred on private lands. Currently, of the 66 known palo de rosa subpopulations, 45 are located within private lands. From those 45, 3 subpopulations (*i.e.,* 7 percent of subpopulations, or 65 individuals) are under protective status (*e.g.,* Hacienda Esperanza, El Tallonal, and Mata de Plátano) (see table, above). The subpopulations on the private natural reserves of El Tallonal and Mata de Plátano are protected from habitat modification, and each has an approved private forest stewardship management plan that includes measures for the protection of listed species within the property (PRDNER 2005, entire). The palo de rosa individuals found at Hacienda La Esperanza Natural Reserve are protected, as this reserve also is managed for conservation by PLN, and the management plan considers palo de rosa in its activities (PLN 2011a, p. 67).

Additional conservation efforts have been implemented throughout coordination among the Service, the U.S. Environmental Protection Agency, and PRDNER resulting in the protection in perpetuity of approximately 257 acres of private forested habitat adjacent to the northern boundary of the GCF, which will benefit the Yauco Landfill palo de rosa subpopulation (PRDNER 2015, p. 1). This conservation effort maintains the connectivity between subpopulations and maximizes the species' viability. In addition, the PRDNER acquired private lands that included suitable habitat for palo de rosa and incorporated them into the GCF, increasing the protected area from the approximately 4,016 ha (9,923 ac) in 1996, to at least 4,400 ha (10,872 ac) (Monsegur 2009, p. 8).

While this criterion has only been partially met, with the identification of additional individuals, populations, and subpopulations, of the 1,144 palo de rosa individuals known, only 341 (29 percent) occur on private lands with no protection. Currently, 407 individuals (representing 36 percent of known individuals or 32 percent of subpopulations) occur in areas managed for conservation.

Together with our partners, we have met delisting criterion 2. In 2015, the Service signed an MOU with the U.S. Army and PRDNER for the protection, management, and recovery of palo de rosa at Fort Buchanan (U.S. Army, Fort Buchanan 2015, entire). As a result, the *mogote* where palo de rosa is found at the military base is managed for conservation, propagation and planting of palo de rosa has taken place, and the species is frequently monitored (USACE 2014, p. 3). Nonetheless, the viability of the Fort Buchanan subpopulation is influenced by interaction with other individuals in neighboring private lands and areas subject to development.

Lastly, we determine delisting criterion 3 to be obsolete. Although species-specific management plans do not exist for Commonwealth forests, the natural reserves are managed for conservation by PRDNER as recommended by the Master Plan for the Commonwealth Forests of Puerto Rico (DNR 1976, entire). These management efforts prevent adverse impacts to plants and animals, particularly listed species such as palo de rosa, and their habitats. Forest management protects palo de rosa along the southern coast of Puerto Rico where the GCF and SCF subpopulations (175 individuals) are located within the boundaries of these forests. The development of effective conservation mechanisms for the species outside Commonwealth forests also protects palo de rosa, as components of the resiliency of populations (*e.g.,* effective cross-pollination, fruit set, and natural recruitment) depend on the interactions among neighboring subpopulations. Thus, we continue working with PRDNER and other partners to monitor and survey suitable unexplored habitat for palo de rosa, to develop sound conservation strategies, and to proactively identify priority areas for conservation. Such conservation measures may include the maintenance and enhancement of effective forested buffer areas and corridors to provide connectivity between palo de rosa subpopulations, and to secure the microhabitat conditions necessary to promote the species' recruitment.

In conclusion, the implementation of recovery actions, in addition to the identification of numerous additional individuals and subpopulations, have reduced the risk of extinction for palo de rosa. Of the 1,144 adult palo de rosa individuals known, only 341 (29 percent) occur on private lands with no protection. Currently, 407 individuals (representing 36 percent of known individuals or 32 percent of subpopulations) occur in areas managed for conservation. Although many individuals occur on protected lands, we have identified 20 subpopulations throughout Puerto Rico where habitat modification and fragmentation can still occur. Puerto Rico's laws and regulations protect palo de rosa on both public and private lands, and other protection mechanisms (*i.e.,* conservation easements) have been implemented, but impacts to palo de rosa subpopulations may occur due to lack of enforcement, misidentification of the species, agricultural practices, and unregulated activities (see Summary of

Biological Status and Threats, below). Based on the biology of palo de rosa and its dependence on cross-pollination, impacts that reduce connectivity between subpopulations may affect the breeding capacity of the species, and thus its long-term recruitment and viability. The recovery of palo de rosa will include collaboration and partnership efforts with PRDNER and private landowners to develop conservation strategies and recommendations when evaluating urban and infrastructure development projects that could affect these subpopulations. Recovery efforts should be directed towards landscape planning and management strategies that would ensure abundance and distribution of palo de rosa subpopulations to allow cross-pollination and recruitment and contribute to the long-term recovery of palo de rosa.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an ''endangered species'' or a ''threatened species.'' The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an ''endangered species'' or a ''threatened species'' because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects. We consider these same five factors in downlisting a species from endangered to threatened or delisting a species (50 CFR 424.11(c)–(e)).

We use the term ''threat'' to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term ''threat'' includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term ''threat'' may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an ''endangered species'' or a ''threatened species.'' In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term foreseeable future extends only so far into the future as we can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

We consider 50 years to be the foreseeable future within which we can reasonably determine the threats, the magnitude of those threats, and the species' response to those threats. The foreseeable future for the individual factors and threats vary. However, based on the available information from ongoing monitoring of populations known at the time of listing, it is estimated that under natural conditions, individuals of palo de rosa may require at least 40 years to reach a reproductive size, and the reproductive ecology of palo de rosa is consistent with late successional species. Within 50 years, an individual plant of palo de rosa would reach a reproductive size and effectively contribute to the next generation. Therefore, this timeframe accounts for maturation, the probability of flowering, effective cross-pollination, setting viable fruits, seed germination, and early seedling survival and establishment, taking into account environmental stochastic events such as drought periods. Some palo de rosa life stages are more sensitive to a particular threat (*e.g.,* seedling and sapling susceptibility to drought conditions); therefore, the species' response to threats in all life stages and the effects of these responses can be reasonably determined within the foreseeable future (50 years). We can also reasonably predict development and habitat fragmentation and modification within this timeframe based on current trends. Furthermore, the established timeframe for the foreseeable future provides for the design and implementation of conservation strategies to protect and enhance currently known populations.

In terms of climate, we recognize that modelled projections for Puerto Rico are characterized by some divergence and uncertainty later in the century (Khalyani *et al.* 2016, p. 275). However, we have reasonable confidence in projections within a 50-year timeframe representing the foreseeable future for palo de rosa because uncertainty is reduced within this timeframe. We assessed the climate changes expected in the year 2070 and determined that

downscaled future climate change scenarios indicate that Puerto Rico is predicted to experience changes in climate that will affect palo de rosa (Khalyani *et al.* 2016, entire). Thus, using a 50-year timeframe for the foreseeable future allows us to account for the effects of projected changes in temperature, the shifting of life zones, and an increase in droughts in the habitat.

Analytical Framework

The 5-year review (USFWS 2017, entire) documents the results of our comprehensive biological status review for the species, including an assessment of the potential threats to the species. The following is a summary of the key results and conclusions from the 5-year review and the best available information gathered since that time. The 5-year review can be found at *http://www.regulations.gov* under Docket No. FWS–R4–ES–2020–0059.

Summary of Biological Status and Threats

Below, we review the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

Habitat Destruction and Modification

Habitat destruction and modification, including forest management practices, were identified as factors affecting the continued existence of palo de rosa when it was listed in 1990 (55 FR 13488; April 10, 1990). At present, forest management practices within Commonwealth forests are not considered a threat to palo de rosa because of existing regulatory mechanisms and lack of evidence of direct impacts to the species due to forest management practices. For example, although there is evidence of palo de rosa individuals with multiple stems due to historical deforestation and harvesting for charcoal production in the GCF, selective harvesting and deforestation is no longer a threat to the GCF population. Similar to the GCF, the palo de rosa SCF population (*i.e.,* Quebrada Peces, Quebrada Grande, and Río Loco subpopulations) is also entirely under conservation, and we have no evidence of adverse impacts to the species due to forest management practices.

However, that is not necessarily the case on private lands; the subpopulations of Montes de Barinas and Guayanilla-CORCO remain vulnerable to deforestation and habitat modification. In Montes de Barinas, palo de rosa occurs on private properties subject to urban development, resulting in encroachment of native dry forest areas, and thus in the isolation of palo de rosa (see 79 FR 53307, September 9, 2014, with reference to threats in the same area). These areas also are threatened by deforestation for cattle grazing and the extraction of timber for fence posts (Román-Guzman 2006, p. 40; see 79 FR 53307, September 9, 2014). In fact, active extraction of timber for fence posts has been reported adjacent to the Montes de Barinas subpopulation and on a neighboring property with other endemic species, with palo de rosa individuals in the Montes de Barinas population likely to be cut if harvesting continued (Monsegur-Rivera 2003–2006, pers. obs.; Morales 2011, pers. comm.). In addition, the area of Montes de Barinas showed evidence of bulldozing and subdivision for urban development (Román-Guzman 2006, p. 40).

The habitat at the Guayanilla-CORCO population is impacted on a regular basis by the Puerto Rico Energy and Power Authority (PREPA) for the maintenance of power lines and associated rights-of-way (USFWS 2017, p. 16). Impacts to the species' habitat have been reported in that area as a result of construction of access roads to PREPA towers (Monsegur-Rivera 2014–2020, pers. obs.). Such habitat disturbance and modification affect the integrity of palo de rosa habitat and likely results in direct and indirect impacts to individuals. In fact, some access roads go through drainages that provide good habitat for palo de rosa and could affect microhabitat conditions necessary for seedling germination and recruitment. In addition, these dirt access roads provide corridors for the establishment of exotic plant species like guinea grass (*Megathyrsus maximus)* and zarcilla (*Leucaena leucocephala*), which outcompete the native vegetation (including palo de rosa) and promote favorable conditions for human-induced fires (USFWS 2017, p. 16). Moreover, these dirt roads are used to access the forested habitat for harvesting of timber for fence posts (Monsegur-Rivera 2014, pers. obs.). Similarly, the habitat in the municipalities of Peñuelas and Ponce (*i.e.,* Punta Cucharas) near the Guayanilla-Peñuelas population has been severely fragmented by urban development (*e.g.,* housing development, hotels, a jail, a landfill, rock quarries, and highway PR–2) (see 79 FR 53307, September 9, 2014), and due to maintenance of PREPA power lines (Monsegur-Rivera 2020, pers. obs.).

In Sierra Bermeja and Cerro las Mesas, private forested lands also have been impacted through deforestation, mainly for agricultural practices (*i.e.,* grazing by cattle and goats, and associated conversion of forested habitat to grasslands) and some urban development (*i.e.,* construction of houses and roads) (Cedeño-Maldonado and Breckon 1996, p. 349; USFWS 1998, p. 6; Envirosurvey, Inc. 2016, p. 6). Most of the Sierra Bermeja mountain range was zoned with specific restrictions on development activities to protect the natural resources of the area (JPPR 2009, pp. 151–153). This zoning allows for agricultural activities and construction of residential homes with the implementation of best management practices and some limitations (JPPR 2009, p. 151; JPPR 2015, pp. 118–129). Nonetheless, landowners continue impacting the habitat through activities like cutting new access roads on their properties and conversion of forested land to pasture (Pacheco and Monsegur-Rivera 2017, pers. obs.). The palo de rosa population in Sierra Bermeja is limited to two isolated individuals on protected lands (LCNWR and PLN conservation easement), with no evidence of natural recruitment. Similarly, the other two palo de rosa individuals in Guaniquilla-Buye, also in southwest Puerto Rico, are found within private lands subject to urban and tourist development, although these plants are not yet impacted.

Core subpopulations of palo de rosa occur in the northern karst belt of Puerto Rico (Lugo *et al.* 2001, p. 1), where approximately 80 percent of the known sites for palo de rosa occur on private lands not managed for conservation. These private lands are encroached upon by development and subject to habitat modification activities (*e.g.,* urban development) detrimental to palo de rosa. The palo de rosa subpopulation at GuCF is the westernmost record of the species in northern Puerto Rico that lies within an area managed for conservation. As previously discussed, the GuCF subpopulations extend to private lands along the Guajataca Gorge. Although the steep terrain and low agricultural value of this area has protected the subpopulations from habitat modification, some remain vulnerable to infrastructure development (*e.g.,* possible expansion of Highway PR–22 between the municipalities of Hatillo and Aguadilla). For example, three previously unknown subpopulations (including one showing recruitment) were located during the biological

assessments for the proposed expansion of Highway PR–22 (PRHTA 2007, p. 19).

Another subpopulation vulnerable to habitat modification is the Merendero-Guajataca; this area is managed for recreation, and the habitat remains threatened by vegetation management activities (*e.g.,* maintenance of green areas and vegetation clearing along trails). Habitat modification can also have implications beyond the direct impacts to a subpopulation. Although the palo de rosa in the Merendero-Guajataca subpopulation have produced flowers, there are no records of fruit production or seedlings (Monsegur-Rivera 2009–present, pers. obs.); this is likely due to habitat modification at the site. Nonetheless, this subpopulation may interact through cross-pollination with the nearby El Túnel-Guajataca subpopulation and, thus, contribute to observed recruitment in other Guajataca Gorge subpopulations. A palo de rosa subpopulation was located during a biological assessment for the proposed expansion of an existing quarry adjacent to the Río Camuy (Sustache-Sustache 2010, p. 7). We expect impacts to this subpopulation from the quarry activities will interfere with the natural recruitment of the species along the Río Camuy.

Habitat encroachment is evident on private lands surrounding the CCF, Hacienda La Esperanza Natural Reserve, and Tortuguero Lagoon Natural Preserve, where at least six known subpopulations occur within private lands adjacent to areas subject to development or infrastructure projects. The subpopulations at Hacienda Esperanza extend to private lands on their southern boundary, where development projects have been proposed (*e.g.,* Ciudad Médica del Caribe; PRDNER 2011, pp. 24–25). Habitat modification in those areas can result in direct impacts to palo de rosa individuals and can interrupt the connectivity between subpopulations (*e.g.,* cross-pollination). In addition, the analysis of aerial images indicates four additional subpopulations occurring on private lands in the proximity of Hacienda Esperanza are encroached upon by urban development, rock quarries, and agricultural areas (Monsegur-Rivera 2018, pers. obs.).

The palo de rosa subpopulations at Hacienda Sabanera in Dorado have been encroached upon by development. We prepared a biological opinion during the consultation process for the construction of Hacienda Sabanera and its associated impacts on palo de rosa (USFWS 1999, entire). The biological opinion indicates that approximately 83 of the 200 acres (including forested *mogote* habitat) would be impacted, and 6 adults, 12 saplings, and 35 seedlings of palo de rosa would be directly affected by the proposed project (USFWS 1999, p. 6). Although we concluded that the project would not jeopardize the continued existence of palo de rosa (USFWS 1999, p. 7), the project resulted in substantial loss of forested habitat, promoting edge habitat favorable for intrusion of weedy species. In addition, a series of *mogotes* along Higuillar Avenue, south of Hacienda Sabanera, are expected to be impacted by proposed road construction (PRDNER 2013, pp. 22–24), and we have no information that plans for the road have been discarded. Encroachment conditions similar to those in Hacienda Sabanera also occur in the areas of La Virgencita (north and south), Mogotes de Nevares, Sabana Seca, Parque de las Ciencias, Parque Monagas, and Fort Buchanan. For example, at La Virgencita, the population of palo de rosa is bisected by Highway PR–2 and could be further impacted if the road is widened in the future. Landslides have occurred in this area in the past and road maintenance in this vulnerable area may trigger slide events (PRDNER 2015, pp. 13–15). In addition, palo de rosa individuals are found within the PREPA power line rights-of-way (Power Line 41500), and there is evidence the overall decrease or absence of saplings or juveniles in the La Virgencita south population may be the result of habitat modification and resulting edge habitat due to the maintenance of the PREPA power line rights-of-way (PRDNER 2015, pp. 13–15; USFWS 2018, p. 33). In addition, the westernmost subpopulation of palo de rosa occurs in the municipality of Aguadilla in an area identified by the Puerto Rico Highway and Transportation Authority (PRHTA) as part of the proposed expansion of highway PR–22 (USFWS 2017, p. 7).

The Mogotes de Nevares, Sabana Seca, Parque de las Ciencias, Parque Monagas, and Fort Buchanan subpopulations are also severely fragmented by urban development and a rock quarry (USFWS 2017, p. 12). Such fragmentation compromises the connectivity between subpopulations. Some of these areas are vulnerable to landslides due to changes in the contour of the terrain associated with a high density of urban development, encroachment, and quarry operations (*e.g.,* Parque Monagas and Fort Buchanan) (U.S. Army 2014, p. 3). Although Fort Buchanan habitat is set aside for conservation, landslides have occurred within and near Fort Buchanan and the subpopulation remains threatened due to potential landslides. Fort Buchanan is evaluating a possible slope stabilization project for the site (U.S. Army 2014, pp. 4, 9–11).

Palo de rosa occurs within several National Parks on Hispaniola (Dominican Republic and Haiti) (*e.g.,* Parque Nacional del Este, Parque Nacional Los Haitises, and Parque Nacional Sierra de Bahoruco). Despite the occurrence of the species within areas managed for conservation (*e.g.,* Parque del Este and Sierra de Bahoruco), these areas continue to be affected by illegal deforestation for agriculture and charcoal production, and enforcement of existing regulations is limited (Jiménez 2019, pers. comm.). The dependence of the human population of Haiti on wood-based cooking fuels (*e.g.,* charcoal and firewood) has resulted in substantial deforestation and forest conversion to marginal habitat in both Haiti and adjacent regions of the Dominican Republic (*e.g.,* Sierra de Bahoruco), and the expected increases in the human population in Haiti will result in an increase in the demand for such fuel resources (USFWS 2018, p. 4). In fact, there has recently been increasing amounts of deforestation and habitat degradation in the Sierra de Bahoruco and the surrounding region (Grupo Jaragua 2011, entire; Goetz et al. 2012, p. 5; Simons et al. 2013, p. 31). In 2013, an estimated 80 square kilometers (19,768.4 acres) of forest in the area was lost primarily due to illegal clearing of forested habitat for agricultural activities (Gallagher 2015, entire). Vast areas (including suitable habitat for palo de rosa) along the border between Haiti and Dominican Republic (including within National Parks) are being cleared and converted to avocado plantations (Monsegur-Rivera 2017, pers. obs.). Such deforestation extends to other National Parks, such as Parque Nacional del Este and Isla Saona, where illegal vegetation clearing for agriculture and tourism development continue to occur (Monsegur-Rivera 2011, pers. obs.). For example, analysis of aerial images from Isla Saona (Parque Nacional del Este) show extensive deforestation and conversion of forested habitat to agricultural lands during the last decade (Monsegur-Rivera 2019, pers. obs.). Impacts to palo de rosa populations due to development and habitat destruction and modification in Hispaniola are not described in the final listing rule for the species (55 FR 13488; April 10, 1990), but current information indicates that palo de rosa and its habitat are being affected by deforestation for agricultural practices and extraction for fuel

resources. To summarize, forest management practices within Commonwealth Forests are no longer considered a threat to palo de rosa. The palo de rosa populations at the CCF, GCF, GuCF, RACF, and SCF are protected, as these forest reserves are protected by Commonwealth laws and managed for conservation. Nonetheless, populations extending onto private lands in southern Puerto Rico are vulnerable to impacts from urban development, agricultural practices (*e.g.,* harvesting fence posts), and maintenance of power lines and rights-of-way (Monsegur-Rivera 2019, pers. obs.). In addition, the majority of the subpopulations along the northern karst of Puerto Rico occur on private lands, where habitat encroachment occurs and creates edge habitat conditions (habitat intrusion by exotics that precludes seedling establishment) and affects connectivity and natural recruitment. For example, despite the abundance of individuals at the palo de rosa subpopulation adjacent to the former CORCO in Guayanilla-Peñuelas, recruitment is limited due to the multiple stressors, including maintenance of power line rights-of-way, fence post harvest, and intrusion of exotic plants species, as well as the changes in microhabitat conditions at these sites, which preclude seedling establishment. Furthermore, habitat fragmentation along the northern coast may affect cross-pollination among subpopulations, resulting in the lack of fruit production at isolated subpopulations with a smaller number of individuals (*e.g.,* Merendero-Guajataca).

Conservation Efforts and Regulatory Mechanisms

In the final listing rule (55 FR 13488; April 10, 1990), we identified the inadequacy of existing regulatory mechanisms as one of the factors affecting the continued existence of palo de rosa. At that time, the species had no legal protection, because it had not been included in Puerto Rico's list of protected species. Once palo de rosa was federally listed, legal protection was extended by virtue of an existing cooperative agreement (under section 6 of the Act) with the Commonwealth of Puerto Rico. Federal listing assured the addition of palo de rosa to the Commonwealth's list of protected species, and the Commonwealth designated palo de rosa as endangered in 2004 (DRNA 2004, p. 52).

In 1999, the Commonwealth of Puerto Rico approved Law No. 241, also known as the New Wildlife Law of Puerto Rico (*Nueva Ley de Vida Silvestre de Puerto Rico*), and palo de rosa is legally protected under this law. The purpose of this law is to protect, conserve, and enhance both native and migratory wildlife species, and to declare as property of Puerto Rico all wildlife species within its jurisdiction, to regulate permits, to regulate hunting activities, and to regulate exotic species, among other activities. This law also has provisions to protect habitat for all wildlife species, including plants. In 2004, the PRDNER approved Regulation 6766 or Regulations to Govern the Management of Species Vulnerable and Danger of Extinction in the Commonwealth of Puerto Rico (*Reglamento para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico*). Article 2.06 of Regulation 6766 prohibits, among other activities, collecting, cutting, and removing of listed plant individuals within the jurisdiction of Puerto Rico (DRNA 2004, p. 11). The provisions of Law No. 241–1999 and Regulation 6766 extend to private lands. However, the protection of listed species on private lands is challenging, as landowners may be unaware that species are protected and may damage those species (*e.g.,* by cutting, pruning, or mowing) (USFWS 2017, p. 23), which might be the case if palo de rosa is cut for fence posts.

Commonwealth of Puerto Rico Law No. 133 (1975, as amended in 2000), also known as Puerto Rico Forests' Law (*Ley de Bosques de Puerto Rico*), protects the areas of the GCF, SCF, GuCF, RACF, and CCF, and, by extension, the palo de rosa individuals on them. Section 8(a) of this law prohibits cutting, killing, destroying, uprooting, extracting, or in any way hurting any tree or vegetation within a Commonwealth forest. The PRDNER also identified these Commonwealth forests as ''critical wildlife areas.'' This designation constitutes a special recognition with the purpose of providing information to Commonwealth and Federal agencies about the conservation needs of these areas, and to assist permitting agencies in precluding adverse impacts as a result of project endorsements or permit approvals (PRDNER 2005, pp. 211–216). In addition, Commonwealth of Puerto Rico Law No. 292 (1999), also known as Puerto Rico Karst Physiographic Protection and Conservation Law (*Ley para la Protección y Conservación de la Fisiografía Cársica de Puerto Rico*), regulates the extraction of rock and gravel for commercial purposes, and prohibits the cutting of native and endemic vegetation in violation of other laws (*e.g.,* Law No. 241–1999 and Regulation 6766). Law No. 292–1999 applies to karst habitat in both southern and northern Puerto Rico.

On the LCNWR, habitat is managed in accordance with the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd–668ee, as amended by the National Wildlife Refuge System Improvement Act of 1997 [Improvement Act]), and collection of plants within refuge lands is prohibited by title 50 of the Code of Federal Regulations (CFR) at § 27.51. The LCNWR has a comprehensive conservation plan that includes measures for the protection and recovery of endangered and threatened plant species (USFWS 2011a, p. 35). Furthermore, the Puerto Rico Planning Board (Junta de Planificación de Puerto Rico) classified most of the mountain range of Sierra Bermeja as a District of Conservation of Resources (Distrito de Conservación de Suelos) (JPPR 2009, p. 151). This conservation category identifies lands with particular characteristics that need to be maintained or enhanced (*e.g.,* provide habitat for species of concern), and establishes specific restrictions for development (JPPR 2009, p. 151). Also, in 2015, the Puerto Rico Planning Board approved the Land Use Plan for Puerto Rico, and categorized most of the Sierra Bermeja Mountains, including the LCNWR, as Rustic Soil Specially Protected (Suelo Rustico Especialmente Protegido) where no urban development is considered due to location, topography, aesthetic value, archaeological value, or ecological value of land (Puerto Rico Planning Board Interactive Map 2020).

The palo de rosa individuals found at Hacienda La Esperanza Natural Reserve are protected, as this reserve also is managed for conservation by PLN, and the management plan considers palo de rosa in its activities (PLN 2011a, p. 67). The PLN also manages the Río Encantado Natural Protected Area, a mosaic of at least 1,818 ac (736 ha) of forested habitat (including extensive areas of suitable habitat for palo de rosa) in the municipalities of Florida, Manatí, and Ciales, and PLN plans to continue acquiring habitat at this geographical area (PLN 2011b, p. 5). Also, palo de rosa is protected and managed under an MOU among the U.S. Army Garrison, Fort Buchanan, the Service, and PRDNER (U.S. Army, Fort Buchanan 2015, entire). This palo de rosa subpopulation is found in a *mogote* designated for conservation (USACE 2014, p. 3).

In addition, the private natural reserves of El Tallonal and Mata de

Plátano, which contain subpopulations of palo de rosa in the municipality of Arecibo, are protected from habitat modification and have approved private forest stewardship management plans that include measures for the protection of listed species within the properties (PRDNER 2005, 47 pp.). We have an extended history of collaboration with these two reserves, providing financial and technical assistance for the implementation of recovery actions to benefit listed species.

In addition to protections provided by the Act, the species is protected from collection and provided management considerations by the Improvement Act within one national wildlife refuge (LCNWR). In addition, the Commonwealth of Puerto Rico legally protects palo de rosa, including protections to its habitat, through Commonwealth Law No. 241–1999 and Regulation 6766, which prohibit, among other actions, collecting, cutting, and removing listed plants. If we downlist this species, we do not expect this species to be removed from legal protection by the Commonwealth. Although these protections extend to both public and private lands, as discussed above, protection of this species on private land is challenging. Habitat that occurs on private land is subject to pressures from agricultural practices (*e.g.,* grazing, harvesting fence posts) and development. Accidental damage or extirpation of individuals has occurred because private landowners or other parties on the property may not be able to identify the species or may not be aware that palo de rosa is a protected species. Habitat modifications and fragmentation continue to occur on private lands, which can increase the likelihood of habitat intrusion by exotic plants and human-induced fires and reduce connectivity between populations and the availability of suitable habitat for the species' recruitment. In short, this plant is now more abundant and widely distributed, including within conservation land, so the threat due to inadequacy of regulatory mechanisms has been reduced. However, the occurrences of palo de rosa on private lands continue to need enforcement of existing prohibitions, as well as increased attention and associated outreach to highlight the species' conservation and importance.

Recruitment

Here, we summarize the continuing threat of low recruitment on palo de rosa populations, and we describe this influence on palo de rosa viability in greater detail under *Recruitment and Population Structure,* above. Characteristics of palo de rosa's life history may contribute to the slow or lack of recruitment observed in current subpopulations (Monsegur-Rivera 2018, pers. obs.). Individual palo de rosa trees grow extremely slowly, and the growth of the saplings is also quite slow, with an estimated height of less than 1 m (3.3 ft) after 20 years of growth. It is estimated that, under natural conditions, individuals of palo de rosa may require at least 40 years to reach a reproductive size. In addition, seeds of this species are not dispersed by any discernible method other than gravity and concentrate under the parental tree. Thus, recruitment is limited to the proximity of the parental tree, limiting the species' potential to colonize further suitable habitat, and limiting the survival of clustered seedlings due to closed canopy conditions and competition with the parental tree.

Population dynamics and survey assessments support the conclusion that palo de rosa is a late successional species, whose saplings may remain dormant under closed canopy conditions, until there is some natural disturbance that provides favorable conditions for the development of the saplings. Thus, the species requires an open canopy to promote seedling growth and is adapted to natural disturbances such as hurricanes (Breckon and Kolterman 1996). Under this scenario, the natural populations show a slow natural recruitment that requires stable habitat conditions with a regime of natural disturbance (*i.e.,* tropical storms or hurricanes).

Reproductive events (*i.e.,* flowering and fruiting) have been associated with larger, more mature trees (Breckon and Kolterman 1992, p. 8; USFWS 2009, p. 4). Cross-pollination between or among subpopulations maximizes the likelihood of fruit production and contributes to recruitment, which underscores the importance of conserving the species through a landscape approach to promote natural recruitment. Although current information on population structure indicates the species requires some open canopy areas to promote recruitment, widespread deforestation fragments habitat and creates edges (habitat transition zones).

There is no evidence of natural recruitment at this time for 40 of the 66 known subpopulations, although the species' life history implies that recruitment may still occur in these populations when a canopy opening is created and suitable conditions for recruitment are present. Forest cover in Puerto Rico has increased since the widespread deforestation in the 1930s (Marcano-Vega *et al.* 2015, p. 67), but the species was likely more widespread prior to deforestation and habitat fragmentation. A life history requirement for a closed canopy forest for adult individuals with canopy openings to promote seedling and sapling recruitment was likely more sustainable in populations with greater abundance and distribution than the species currently exhibits. Smaller and more isolated subpopulations are less able to provide closed canopy conditions with small pockets of openings; thus, inherent palo de rosa life history characteristics have an effect on recruitment, and this effect is expected to continue in the future.

Hurricanes and Related Threats

At the time of listing, we considered individuals of palo de rosa vulnerable to flash flood events (see 55 FR 13490, April 10, 1990). Flash floods remain a moderate threat and may compromise the natural recruitment of seedlings, particularly on subpopulations along the southern coast of Puerto Rico where the species occurs at the bottom of drainages (USFWS 2017, p. 17). Below, we describe these threats and other natural and human-caused factors affecting the continued existence of palo de rosa.

As an endemic species to the Caribbean, palo de rosa is expected to be well adapted to tropical storms and associated disturbances such as flash floods. Under natural conditions, healthy populations with robust numbers of individuals and recruitment should withstand tropical storms, and these weather and climatic events may be beneficial for the population dynamics of palo de rosa by creating small openings in the closed canopy to allow seedling and sapling growth. The islands of the Caribbean are frequently affected by hurricanes. Puerto Rico has been directly affected by four major hurricanes since 1989. Successional responses to hurricanes can influence the structure and composition of plant communities in the Caribbean islands (Lugo 2000, p. 245; Van Bloem *et al.* 2003, p. 137; Van Bloem *et al.* 2005, p. 572; Van Bloem *et al.* 2006, p. 517). Examples of the visible effects of hurricanes on the ecosystem includes massive defoliation, snapped and wind-thrown trees, large debris accumulations, landslides, debris flows, and altered stream channels, among others (Lugo 2008, p. 368). Hurricanes can produce sudden and massive tree mortality, which varies among species but averages about 41.5 percent (Lugo 2000, p. 245). Hence, small populations

of palo de rosa may be severely impacted by hurricanes, resulting in loss of individuals or extirpation. The impact of catastrophic hurricanes is exacerbated in small populations.

There is evidence of damage to individuals of palo de rosa due to previous hurricane events (*e.g.,* Hurricane Georges in 1998) at the Hacienda Sabanera and Hacienda Esperanza subpopulations (USFWS 2017, p. 17). A post-hurricane assessment of selected populations of palo de rosa was conducted to address the impact of Hurricane María (USFWS 2018, entire). Even though Hurricane María did not directly hit the GCF, evidence of damage to palo de rosa trees was recorded at Cañon Las Trichilias (*e.g.,* uprooted trees and main trunk broken) (USFWS 2018, p. 3). Additional evidence of direct impacts (including mortality) due to Hurricane María were recorded in the Hacienda Esperanza, Hacienda Sabanera, Parque Monagas, and La Virgencita subpopulations (USFWS 2018, entire). An analysis of high-resolution aerial images from these sites following Hurricane María shows extensive damage and modification to the forest structure, with subpopulations in southern Puerto Rico exposed to less wind damage (Hu and Smith 2018, pp. 1, 17). When comparing affected subpopulation abundance, the evidence of direct impacts to individuals of palo de rosa due to Hurricane María appear to be discountable. However, this post-hurricane assessment focused on previously surveyed robust subpopulations (USFWS 2018, entire). Overall, the subpopulations along the northern coast of Puerto Rico suffered severe defoliation, with trees showing mortality of the crown apex, but some trees showing regrowth 6 months post-hurricane (USFWS 2018, entire).

However, hurricane damage extends beyond the direct impacts to individual palo de rosa trees. As mentioned above, the subpopulations along the northern coast of Puerto Rico are severely fragmented due to prior land-use history. Disturbance and edge effects associated with urban development and infrastructure corridors may promote the establishment and spread of invasive, nonnative plant species, and lianas (woody vines) typical of early or intermediate successional stages, which may result in rare and endemic plant species being outcompeted (Hansen and Clevenger 2005, p. 249; Madeira *et al.* 2009, p. 291). Hurricanes may not introduce nonnative species to the forest structure, but they can promote favorable conditions for these species and therefore increase the relative abundance of nonnatives.

Habitat intrusion by exotics is positively correlated to the distance of the disturbance gap (Hansen and Clevenger 2005, p. 249). Thus, the adverse effects from human-induced habitat disturbance (*e.g.,* deforestation and urban development) can be exacerbated by hurricanes by creating or increasing this disturbance gap. A post-hurricane assessment provided evidence that all palo de rosa subpopulations along the north coast of Puerto Rico showed habitat intrusion by weedy vines (*e.g., Dioscorea alata* (ñame), *Thunbergia grandiflora* (pompeya), *Cissus erosa* (caro de tres hojas), and *Cayaponia americana* (bejuco de torero)) following Hurricane María (USFWS 2018, entire). In the same assessment, weedy vegetation and vines densely covered an area in the Hacienda Esperanza subpopulation, where palo de rosa occurs at a low-elevation *mogote,* and Hacienda Sabanera, where the habitat that harbors the palo de rosa population was cut to the edge of the population of the species due to urban development (USFWS 2018, pp. 8–18). Examination of aerial images of the habitat shows a flattened forest structure indicative of hurricane damage, with standing trees missing main branches and canopy. Competition with nonnative species and weedy vines for necessary resources (space, light, water, nutrients) may reduce the natural recruitment by inhibiting germination and outcompeting seedlings of native species (Rojas-Sandoval and Meléndez-Ackerman 2013, p. 11; Thomson 2005, p. 615). Palo de rosa seedlings at Hacienda Esperanza were covered (and outcompeted) by weedy vines following Hurricane María (USFWS 2018, p. 8). At Fort Buchanan, 6 months after Hurricane María, the vegetation at the base of the *mogote* on that property was overgrown and dominated by weedy species. However, weedy vegetation had not reached palo de rosa individuals at the top of the *mogote,* and there was little evidence of adverse impacts to seedlings and saplings due to competition with exotics (USFWS 2018, p. 8).

The GCF subpopulations of palo de rosa are surrounded by a large tract of intact native forest, providing a buffer zone that precludes habitat invasion by exotics. Despite the overall evidence of canopy opening and some impacts to individuals of palo de rosa due to Hurricane María, there was no evidence of habitat intrusion by exotics at Cañon Las Trichilias and Cañon Hoya Honda (USFWS 2018 pp. 3–8), which highlights the importance of maintaining native forested habitat that provides a buffer for palo de rosa subpopulations.

The above discussion indicates that the potential adverse impacts due to hurricanes and the associated habitat intrusion by exotic plant species are variable, depending on habitat fragmentation, topography, distance to disturbance, and the size of the subpopulation. It further highlights the importance of having healthy populations with robust numbers of individuals and a stratified population structure (*i.e.,* seedlings, saplings, and adults) to allow for recovery following hurricanes and associated habitat disturbance.

Climate Change

Regarding the effects of climate change, the Intergovernmental Panel on Climate Change (IPCC) concluded that warming of the climate system is unequivocal (IPCC 2014, p. 3). Observed effects associated with climate change include widespread changes in precipitation amounts and aspects of extreme weather including droughts, heavy precipitation, heat waves, and the intensity of tropical cyclones (IPCC 2014, p. 4). Rather than assessing climate change as a single threat in and of itself, we examined the potential effects to the species and its habitat that arise from changes in environmental conditions associated with various aspects of climate change.

We examined a downscaled model for Puerto Rico based on three IPCC global emissions scenarios from the CMIP3 data set—mid-high (A2), mid-low (A1B), and low (B1)—as the CMIP5 data set was not available for Puerto Rico at that time (Khalyani et al. 2016, pp. 267, 279–280). These scenarios are generally comparable and span the more recent representative concentration pathways (RCP) scenarios from RCP 4.5 (B1) to RCP 8.5 (A2) (IPCC 2014, p. 57). The B1 and A2 scenarios encompass the projections and effects of the A1B scenario; we will describe our analyses for the B1 (RCP 4.5) and A2 (RCP 8.5) scenarios and recognize the A1B (RCP 6.0) projections and effects fall into this range.

The modelling of climate projections expected in Puerto Rico used in our analysis extends to 2100. We acknowledge inherent divergence in climate projections based on the model chosen, with uncertainty increasing later in the century (Khalyani et al. 2016, p. 275). However, we assessed the climate changes expected in the year 2070, a 50-year timeframe representing the foreseeable future for palo de rosa (as described in *Regulatory Framework,*

above). Under the RCP 4.5 and 8.5 scenarios, precipitation declines while temperature and total dry days increase, resulting in extreme drought conditions that would result in the conversion of subtropical dry forest into dry and very dry forest (Khalyani et al. 2016, p. 280). Downscaled future climate change scenarios indicate that by 2070, Puerto Rico is predicted to experience a decrease in rainfall, along with increased drought intensity under RCP 4.5 and 8.5 (Khalyani *et al.* 2016, p. 265; Bhardwaj *et al.* 2018, p. 133; U.S. Global Change Research Program (USGCRP) 2018, 20:820). The western region of Puerto Rico has already experienced negative trends in annual rainfall (PRCC 2013, p. 7). Temperatures are also expected to rise between 2020 and 2070. Under RCP 4.5, a mean temperature increase of 4.6–5.4 degrees Celsius (°C) (40.3–41.7 degrees Fahrenheit (°F)) is projected, and an increase of 7.5–9 °C (45.5–48.2 °F) is projected under RCP 8.5 (Khalyani et al. 2016, p. 275). As precipitation decreases influenced by warming, it will tend to accelerate the hydrological cycles, resulting in wet and dry extremes (Jennings *et al.* 2014, p. 4; Cashman et al. 2010, p. 1). Downscaled general circulation models predict dramatic shifts in the life zones of Puerto Rico with potential loss of subtropical rain, moist, and wet forests, and the appearance of tropical dry and very dry forests are anticipated under both RCP 4.5 and 8.5 scenarios (Khalyani *et al.* 2016, p. 275). Nonetheless, such predicted changes in life zones may not severely affect palo de rosa due to its distribution throughout Puerto Rico, which includes different life zones and habitat types.

Vulnerability to climate change impacts is a function of sensitivity to those changes, exposure to those changes, and adaptive capacity (IPCC 2007, p. 89; Glick and Stein 2010, p. 19). As described earlier, palo de rosa is a species with low recruitment and seed dispersal limited to gravity, limiting its potential to reach areas with suitable microhabitat conditions for its establishment. Despite the evidence of multiple reproductive events (fruit production) in one subpopulation, low recruitment of saplings and a population structure dominated by adult trees could be the result of mortality and thinning of individuals at the seedling stage due to drought stress. The projected prolonged droughts expected with climate change may affect the phenology of palo de rosa, resulting in the loss of developing flowers and fruits, or reduce the viability of the few produced seeds, reducing the likelihood of natural recruitment. In addition, hurricanes followed by extended periods of drought caused by climate change may result in microclimate alterations that could allow other plants (native or nonnative) to become established and become invasive (Lugo 2000, p. 246), which would preclude the recruitment of palo rosa seedlings.

Based the distribution of palo de rosa and its habitat, we have determined that conditions associated with climate change could impact this species. Climate change is almost certain to affect terrestrial habitats and palo de rosa; however, the future extent and timing of those effects beyond the foreseeable future is uncertain. Some terrestrial plant populations are able to adapt and respond to changing climatic conditions (Franks *et al.* 2013, entire), but the ability of palo de rosa to do so is unknown. A sound, long-term monitoring of known palo de rosa populations is needed to understand the effects on the species' viability.

In summary, other natural and manmade factors, such as hurricanes and related threats due to habitat fragmentation, edge habitat, habitat intrusion by exotic plant species, and the low recruitment and limited dispersal of palo de rosa, are current threats to the species. Hurricanes and post-hurricane habitat encroachment and nonnative plant invasion have affected subpopulations along the northern coast of Puerto Rico (USFWS 2018, entire). Invasive species can preclude the establishment of new palo de rosa individuals through competition for sunlight, nutrients, water, and space to grow. Although climate change is almost certain to affect terrestrial habitats, there is uncertainty about how predicted future changes in temperature, precipitation, and other factors will influence palo de rosa.

Small Population Size

At the time of listing (55 FR 13488; April 10, 1990), we considered small population size as a threat affecting the continued survival of palo de rosa, based on the species' limited distribution and low number of individuals (*i.e.,* only 9 individuals throughout the species' range in Puerto Rico). Based on this information, we considered the risk of extinction of palo de rosa very high. New distribution and abundance information available since the species was listed reflects that palo de rosa is more abundant and widely distributed than previously thought (USFWS 2017, entire); thus, we no longer consider limited distribution as an imminent threat to this species. However, at least 37 (56 percent) of the known subpopulations are composed of 10 or fewer individuals. The effect of small population size exacerbates other threats and makes these subpopulations vulnerable to extirpation by stochastic and catastrophic events.

Overall Summary of Factors Affecting the Species

We have carefully assessed the best scientific and commercial information available regarding the threats faced by palo de rosa in developing this proposed rule. Limited distribution and a low number of individuals were considered a threat to palo de rosa when we listed the species (55 FR 13488; April 10, 1990), but recent information indicates the species is more abundant and widely distributed than known at the time of listing. However, other threats are still affecting palo de rosa. Based on the analysis above, although we no longer consider limited distribution as an imminent threat to this species, we conclude that habitat destruction and modification on privately owned lands (particularly along the northern coast of Puerto Rico), and other natural or manmade factors (*e.g.,* hurricanes, habitat fragmentation resulting in lack of connectivity between individuals, and habitat encroachment by invasive species) have been greatly reduced but continue to threaten palo de rosa populations. In addition, low recruitment related to sporadic flowering and fruit production, and the slow growth of seedlings under close canopy conditions (*e.g.,* species reproductive biology and ecology), coupled with the threats discussed above, are expected to remain threats to palo de rosa. It is also expected that palo de rosa will be affected by climate change within the foreseeable future, particularly by generalized changes in precipitation and drought conditions. Climate change is expected to result in more intense hurricanes and extended periods of drought. Increased hurricanes are expected to cause direct mortality of adult trees downed due to high winds, whereas more intense drought conditions are expected to reduce the species' reproductive output (reduced flowering and fruiting events) and also preclude seedling and sapling recruitment. However, based on the best available data, we do not consider climate change to represent a current or an imminent threat to this species across its range.

Species viability, or the species' ability to sustain populations over time, is related to the species' ability to withstand catastrophic population- and species-level events (redundancy), to adapt to novel changes in its biological

and physical environment (representation), and to withstand environmental and demographic stochasticity and disturbances (resiliency). The viability of a species is also dependent on the likelihood of new stressors or continued threats, now and in the future, that act to reduce a species' redundancy, representation, and resiliency. A highly resilient palo de rosa population should be characterized by sufficient abundance and connectivity between reproductive individuals to allow for reproductive events and cross-pollination, an age class structure representative of recruitment greater than mortality, multiple subpopulations within the population, and the availability of high-quality habitat to allow for recruitment. High representation for the species is characterized by multiple populations occurring within a wide range of environmental conditions (*e.g.,* substrate and precipitation) that allow for sufficient genetic variability. Multiple resilient populations across the range of the species characterize high redundancy for palo de rosa.

We evaluated the biological status of palo de rosa both currently and into the future, considering the species' viability as characterized by its resiliency, redundancy, and representation. Based on the analysis of available herbarium specimens, we have determined the species' distribution and abundance was once more common and widespread, and was likely a dominant late successional species of coastal to middle elevation (500 m (1,640 ft)) habitats, and even extended to coastal valleys and sand dunes (see table, above) (Monsegur-Rivera 2019, pers. obs.). The current known palo de rosa subpopulations are remnants of the species' historical distribution, persisting on areas of low agricultural value (*e.g.,* top of the *mogotes*) that were affected by deforestation for charcoal production, as evidenced by individuals with multiple trunks of palo de rosa sprouting from the same base. Based on the available information on palo de rosa's natural distribution at the time of listing, and considering that 40 of the known 66 subpopulations currently show no recruitment and no subpopulations appear to be expanding due to natural dispersal, palo de rosa populations exhibit reduced resiliency. No subpopulations appear to be dispersing, and no populations are highly resilient. None of the currently known subpopulations of palo de rosa are considered a recent colonization event or natural expansion of the species within its habitat. The species persisted through the almost entire deforestation of Puerto Rico with less than 6 percent of remaining forested habitat across the island by the 1930s (Franco *et al.* 1997, p. 3), when the low elevation coastal valleys habitat of palo de rosa was extensively deforested for agricultural practices (*e.g.,* sugar cane and tobacco plantations). There are broad accounts regarding the extensive deforestation and habitat modification that occurred in Puerto Rico until the 1950s (Franco *et al.* 1997, p. 3), which resulted in changes in forest structure and diversity, pollinators' assemblages, seed dispersers, and the prevailing microhabitat conditions in which palo de rosa evolved. Despite the return from such deforestation, known subpopulations show a clustered and patchy distribution, and are characterized by a population structure dominated by adults. Moreover, the species faces a low recruitment rate and slow growth, resulting in few saplings reaching a reproductive size; in addition, the species shows minimal or no dispersal (limited to gravity). Based on our observations, it has taken about 60 years from the peak of deforestation (1930s) for palo de rosa to show some initial evidence of recruitment.

We consider that palo de rosa has limited redundancy, as it is known from multiple subpopulations (66) throughout its geographical range, representing 14 natural populations distributed throughout the southern and northern coasts of Puerto Rico. Nonetheless, about 37 (56 percent) of the known subpopulations are composed of 10 or fewer individuals and show little or no recruitment and, thus, reduced resiliency (see table, above). As described above, the species faces a low recruitment rate, slow growth and limited dispersal, and patchy and small subpopulations, resulting in an increased vulnerability to extirpation of these subpopulations. All these characteristics are limiting factors and make the species vulnerable to catastrophic and stochastic events, such as hurricanes and droughts, that can cause local extirpations. The best available information indicates that palo de rosa is not naturally expanding into or colonizing habitats outside the areas where it is known to occur.

In terms of the representation of palo de rosa, we have no data on its genetic variability. Although the species occurs in a wide range of habitats and environmental conditions, it has a fragmented distribution, scattered (sporadic) flowering events, and a low recruitment rate. Thus, little or no genetic exchange is thought to occur between extant subpopulations, likely resulting in outbreeding depression, which may explain the lack of effective reproduction and recruitment (Frankham *et al.* 2011, p. 466). The low recruitment rate results in little transfer of genetic variability into future generations, limits the expansion of the species outside its current locations, and limits its ability to adapt to changing environmental conditions. For example, the loss or reduction of connectivity between subpopulations in areas like Arecibo-Vega Baja, Dorado, La Virgencita, Mogotes de Nevares, and San Juan-Fajardo can be detrimental to the long-term viability of the species as it affects cross-pollination and, therefore, gene flow. In fact, the only populations that occur entirely within native forest areas managed for conservation are GCF and SCF. This continued protected habitat provides for an effective cross-pollination (gene flow) that can secure the long-term viability of the species. However, the overall representation of palo de rosa is reduced, as the GCF and SCF populations are restricted to the southern coast and the genetic representation of palo de rosa in the northern karst area, a different ecological environment, is vulnerable because that habitat is threatened by destruction or modification.

Determination of Palo de Rosa's Status

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of ''endangered species'' or ''threatened species.'' The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered within the foreseeable future throughout all or a significant portion of its range. For a more detailed discussion on the factors considered when determining whether a species meets the definition of an ''endangered species'' or a ''threatened species'' and our analysis on how we determine the foreseeable future in making these decisions, please see Regulatory and Analytical Framework, above.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we have determined that palo de rosa's current viability is higher than was known at the time of listing (population current estimate of 1,144 individuals in 66 subpopulations) based on the best available information.

Currently, the number of palo de rosa individuals has changed from 9 individuals in protected lands at the time of listing to 407 individuals (32 percent of subpopulations) currently occurring in areas managed for conservation (*e.g.,* Commonwealth Forest and Federal lands). Furthermore, 396 individuals (38 percent of subpopulations) occur in areas subject to little habitat modification due to the steep topography in the northern karst region of Puerto Rico. The remaining 30 percent of the subpopulations (containing approximately 341 individuals) occur within areas severely encroached and vulnerable to urban or infrastructure development. Nonetheless, habitat destruction and modification on privately owned lands (particularly along the northern coast of Puerto Rico) and other natural or manmade factors (such as hurricanes, habitat fragmentation, lack of connectivity between populations, habitat intrusion by invasive species, and the species' reproductive biology) continue to threaten the viability of palo de rosa. Although population numbers and abundance of palo de rosa have increased, and some identified threats have decreased, our analysis indicates that threats remain. Thus, after assessing the best available information, we conclude that palo de rosa no longer meets the Act's definition of an endangered species throughout all of its range. We therefore proceed with determining whether palo de rosa meets the Act's definition of a threatened species (*i.e.,* is likely to become endangered within the foreseeable future) throughout all of its range.

In terms of habitat destruction and modification, we can reasonably determine that 70 percent of subpopulations (71 percent of individuals) are not expected to be substantially affected by habitat destruction and modification in the foreseeable future. This majority occurs within protected lands managed for conservation (36 percent of the known individuals or 32 percent of subpopulations) or on private lands with low probability of modification due to steep topography (35 percent of the known individuals or 38 percent of subpopulations). However, for the 30 percent of subpopulations occurring in areas severely encroached and vulnerable to urban or infrastructure development now and into the future (30 percent of the known individuals), we are reasonably certain these subpopulations will continue to have a lower resiliency (due to reduced connectivity (cross-pollination) and lack of recruitment), and, in some cases, may experience the loss of individuals or subpopulations adjacent to critical infrastructure such as highways or other development within the foreseeable future (*e.g.,* Hacienda Sabanera, PR–2 and PR–22 maintenance and expansion, Islote Ward extirpation).

We have evidence that some populations are showing signs of reproduction and recruitment. However, due to the slow growth of the species it may take several decades to ensure these recruitment events effectively contribute to a population's resiliency (new individuals reach a reproductive size). Despite no longer considering limited distribution as an imminent threat to this species, we have identified factors associated with habitat modification and other natural or manmade factors that still have some impacts on palo de rosa and affect the species' viability and effective natural recruitment. The species still faces dispersal problems, and the recruitment is still limited to the proximity of parent trees; we have no evidence of a population of palo de rosa that is the result of a recent colonization event or a significant population expansion. This renders the known subpopulations vulnerable to adverse effects related to habitat fragmentation and lack of connectivity, which may preclude future recruitment and the population's resiliency.

In addition, despite the presence of regulations protecting the species both on public and private lands, the protection of palo de rosa on private lands remains challenging. Habitat modifications and fragmentation continue to occur on private lands, which can increase the likelihood of habitat intrusion by exotic plants and human-induced fires, and reduce connectivity between populations (affecting cross-pollinations) and the availability of suitable habitat for the natural recruitment of the species. Still, none of these is an imminent threat to the species at a magnitude such that the taxon warrants endangered status across its range. Thus, after assessing the best available information, we conclude that palo de rosa is not currently in danger of extinction, but it is likely to become in danger of extinction in the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson,* 2020 WL 437289 (D.D.C. Jan. 28, 2020) (*Center for Biological Diversity*), vacated the aspect of the Final Policy on Interpretation of the Phrase ''Significant Portion of Its Range'' in the Endangered Species Act's Definitions of ''Endangered Species'' and ''Threatened Species'' (79 FR 37578; July 1, 2014) that provided that the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant, and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the ''significance'' question or the ''status'' question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Center for Biological Diversity,* we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (*i.e.,* endangered). In undertaking this analysis for palo de rosa, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is may be endangered. Kinds of threats and levels of threats are more likely to vary across a species' range if the species has a large range rather than a very small natural range, such as the palo de rosa. Species with limited ranges are more likely to experience the same kinds and generally the same levels of threats in all parts of their range.

For palo de rosa, we considered whether the threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale in the context of its small natural range. We examined the following threats: Habitat destruction, fragmentation, and modification; invasive species; hurricanes; and the effects of climate change, including cumulative effects. We have identified that habitat destruction and modification is threatening known populations in three of the five areas

along the southern coast of Puerto Rico and eight of nine populations along the northern coast of Puerto Rico, particularly on privately owned lands throughout the range of the species. In addition, habitat destruction and modification are occurring within the species' range in Hispaniola. Habitat encroachment by invasive plant species and habitat fragmentation caused by harvesting of timber for fence posts and maintaining rights-of-way are also considered to be further stressors to the viability of palo de rosa across the species' range. Changes in climatic conditions are expected to result in more intense hurricanes and extended periods of drought under RCPs 4.5 and 8.5, but the effect of these changes on palo de rosa is unknown. The expected changes in climatic conditions will affect all populations of palo de rosa uniformly across the range of the species. Lastly, palo de rosa populations across the range experience low recruitment rates, slow growth, and limited dispersal.

We found no concentration of threats in any portion of palo de rosa's range at a biologically meaningful scale. Thus, there are no portions of the species' range where the species has a different status from its rangewide status. Therefore, no portion of the species' range provides a basis for determining that the species is in danger of extinction in a significant portion of its range, and we determine that the species is likely to become endangered within the foreseeable future throughout all of its range. This is consistent with the courts' holdings in *Desert Survivors* v. *Department of the Interior,* No. 16–cv–01165–JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

Our review of the best available scientific and commercial information indicates that palo de rosa meets the Act's definition of a threatened species. Therefore, we propose to reclassify palo de rosa as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. We are proposing to reclassify palo de rosa as a threatened species, and if we adopt this rule as proposed, the prohibitions in section 9 would no longer apply directly to the palo de rosa. We are therefore proposing below a set of regulations to provide for the conservation of the species in accordance with section 4(d) of the Act, which also authorizes us to apply any of the prohibitions in section 9 of the Act to a threatened species. The proposal, which includes a description of the kinds of activities that would or would not constitute a violation, complies with this policy.

II. Proposed Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary of the Interior shall issue such regulations as he deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like ''necessary and advisable'' demonstrates a large degree of deference to the agency (see *Webster* v. *Doe,* 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9 of the Act.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see *Alsea Valley Alliance* v. *Lautenbacher,* 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service,* 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana* v. *Verity,* 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, ''once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him with regard to the permitted activities for those species. He may, for example, permit taking, but not importation of such species, or he may choose to forbid both taking and importation but allow the transportation of such species'' (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising this authority under section 4(d), we have developed a proposed rule that is designed to address palo de rosa's specific threats and conservation needs. Although the statute does not require us to make a ''necessary and advisable'' finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of palo de rosa. As discussed above under Summary of Biological Status and Threats, we have concluded that palo de rosa is likely to become endangered within the foreseeable future primarily due to habitat destruction and modification, particularly by urban development, right-of-way maintenance, rock quarries, and grazing. Additionally, other natural or manmade factors like hurricanes, invasive species, and landslides still threaten the species. The provisions of this proposed 4(d) rule would promote conservation of palo de rosa by encouraging conservation programs for the species and its habitat and promoting additional research to inform future habitat management and recovery actions for the species. The provisions of this proposed rule are one of many tools that we would use to promote the conservation of palo de rosa. This proposed 4(d) rule would apply only if and when we make final the reclassification of palo de rosa as a threatened species.

Provisions of the Proposed 4(d) Rule

This proposed 4(d) rule would provide for the conservation of palo de rosa by prohibiting the following activities, except as otherwise authorized or permitted: Importing or exporting; certain acts related to removing, damaging, and destroying; delivering, receiving, transporting, or shipping in interstate or foreign commerce in the course of commercial

activity; or selling or offering for sale in interstate or foreign commerce.

As discussed above under Summary of Biological Status and Threats, the present or threatened destruction, modification, or curtailment of the species' habitat or range (specifically, urban development, maintenance of power lines and associated rights-of-way, infrastructure development, rock quarries, grazing by cattle, and extraction of fence posts), inadequacy of existing regulatory mechanisms, and other natural or manmade factors affecting the species' continued existence (specifically, hurricanes, invasive plant species, landslides, and habitat fragmentation and lack of connectivity between subpopulations) are affecting the status of palo de rosa. A range of activities have the potential to impact this plant, including recreational and commercial activities. Regulating these activities will help preserve the species' remaining populations, slow their rate of potential decline, and decrease synergistic, negative effects from other stressors. As a whole, the regulation would help in the efforts to recover the species.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened plants under certain circumstances. Regulations governing permits are codified at 50 CFR 17.72. With regard to threatened plants, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for botanical or horticultural exhibition, for educational purposes, or for other purposes consistent with the purposes and policy of the Act. Additional statutory exemptions from the prohibitions are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State and Territorial natural resource agency partners in contributing to conservation of listed species. State and Territorial agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State and Territorial agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Services in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Services shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a Territorial conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, would be able to conduct activities designed to conserve palo de rosa that may result in otherwise prohibited activities for plants without additional authorization.

We also recognize the beneficial and educational aspects of activities with seeds of cultivated plants, which generally enhance the propagation of the species, and therefore would satisfy permit requirements under the Act. We intend to monitor the interstate and foreign commerce and import and export of these specimens in a manner that will not inhibit such activities, providing the activities do not represent a threat to the survival of the species in the wild. In this regard, seeds of cultivated specimens would not be regulated provided a statement that the seeds are of ''cultivated origin'' accompanies the seeds or their container.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or our ability to enter into partnerships for the management and protection of palo de rosa. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between us and other Federal agencies, where appropriate. We ask the public, particularly State and Territorial agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that the Service could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see Information Requested, above).

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act

We have determined that environmental assessments and environmental impact statements, as defined in the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with determining a species' listing status under the Endangered Species Act. In an October 25, 1983, notice in the **Federal Register** (48 FR 49244), we outlined our reasons for this determination, which included a compelling recommendation from the Council on Environmental Quality that we cease preparing environmental assessments or environmental impact statements for listing decisions.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have determined that there are no Tribal lands affected by this proposal.

References Cited

A complete list of references cited is available on *http://www.regulations.gov* under Docket Number FWS–R4–ES–2020–0059 and upon request form the Caribbean Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this document are staff members of the Caribbean Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

■ 2. Amend § 17.12(h) by revising the entry ''*Ottoschulzia rhodoxylon*'' under FLOWERING PLANTS in the List of Endangered and Threatened Plants to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Scientific name	Common name	Where listed	Status	Listing citations and applicable rules
FLOWERING PLANTS				
* *	*	*	*	* *
Ottoschulzia rhodoxylon	Palo de rosa	Wherever found	T	55 FR 13488, 4/10/1990; [**Federal Register** citation of final rule]; 50 CFR 17.73(g).[4d]
* *	*	*	*	* *

■ 3. Add § 17.73 to read as follows:

§ 17.73 Special rules—flowering plants.

(a) through (f) [Reserved]

(g) *Ottoschulzia rhodoxylon* (palo de rosa).

(1) *Prohibitions.* The following prohibitions that apply to endangered plants also apply to *Ottoschulzia rhodoxylon* (palo de rosa). Except as provided under paragraph (g)(2) of this section, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.61(b) for endangered plants.

(ii) Remove and reduce to possession from areas under Federal jurisdiction, as set forth at § 17.61(c)(1).

(iii) Maliciously damage or destroy the species on any areas under Federal jurisdiction, or remove, cut, dig up, or damage or destroy the species on any other area in knowing violation of any law or regulation of the Territory or in the course of any violation of a Territorial criminal trespass law, as set forth at section 9(a)(2)(B) of the Act.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.61(d) for endangered plants.

(v) Sell or offer for sale, as set forth at § 17.61(e) for endangered plants.

(2) *Exceptions from prohibitions.* In regard to *Ottoschulzia rhodoxylon* (palo de rosa):

(i) The prohibitions described in paragraph (g)(1) of this section do not apply to activities conducted as authorized by a permit issued in accordance with § 17.72.

(ii) Any employee or agent of the Service or of a Territorial conservation agency that is operating under a conservation program pursuant to the terms of a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by that agency for such purposes, may, when acting in the course of official duties, remove and reduce to possession from areas under Federal jurisdiction members of palo de rosa that are covered by an approved cooperative agreement to carry out conservation programs.

(iii) You may engage in any act prohibited under paragraph (g)(1) of this section with seeds of cultivated specimens, provided that a statement that the seeds are of ''cultivated origin'' accompanies the seeds or their container.

Martha Williams,

Principal Deputy Director, Exercising the Delegated Authority of the Director, U.S. Fish and Wildlife Service.

[FR Doc. 2021–14661 Filed 7–13–21; 8:45 am]

BILLING CODE 4333–15–P